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JUNE 1919

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PEXTO
SHOP-WAYS
No. 3

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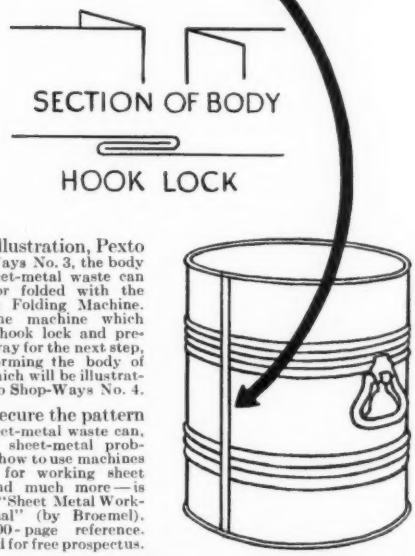

IN this illustration, Pexto Shop-Ways No. 3, the body of a sheet-metal waste can is edged or folded with the Pexto Bar Folding Machine. This is the machine which forms the hook lock and prepares the way for the next step, that of forming the body of the pail which will be illustrated in Pexto Shop-Ways No. 4.

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PEXTO
SHEET METAL WORKERS' MACHINES & TOOLS

INDUSTRIAL-ARTS MAGAZINE

Vol. VIII JUNE, 1919 No. 6

THE TRAINING OF AVIATION MECHANICS

Ernest Bennett, State Manual Training Normal School, Pittsburg, Kansas

SCHOOLMEN who are interested in the teaching of the manual arts will be glad to know, it is believed, something of the manner in which the government is training mechanics for the air service. This training is done in two large schools set aside for that purpose, one at St. Paul and the other on Kelly Field, near San Antonio. Data that follows was gathered at Kelly Field, but applies in the main to the St. Paul school as well.

The Enlisted Mechanics' Training Department is the name given to Kelly Field school. It is quartered in several hangars beside one of the flying fields, so that the work done may be given the crucial test of a flight. It is in these hangars that the men who are expected to keep the American air service in Europe at a maximum efficiency are given their technical knowledge and experience.

The training department has four divisions. They are: Aeronautical motors, the airplane, propeller making, and transportation. A mechanic is expected to complete the course in one department only. There are also subdivisions of blacksmithing and motor cycles, to which men are assigned, as to the four main divisions.

A trades' test board decides whether a man should be placed in any division of the training department or assigned elsewhere. The recruit generally takes this examination within fifteen days after appearing in camp. However, men who have been in the service for some time may also be admitted to the school upon application and a satisfactory showing before the trades' test board.

No rigid rules by which the board shall be governed are laid down. It rests with the judgment of these experts whether a recruit is eligible for the Mechanics' Training Department. However, a candidate must be able to show his aptitude for mechanical work. Generally speaking, it may be said each man admitted was a mechanic in civilian life. But the kinds of mechanical experience the students have had are about as varied as are the possibilities.

The ambitious young mechanic finds the most difficulty in obtaining admission to the section on aero motors. He must have had two years' shop experience with gas engines, or its equivalent. Men who wish to become propeller makers are subjected to almost as close scrutiny, for only superior workmen can be entrusted with this important task. It is the rule of the board to be especially careful in its choice of men for these two divisions.

Men to be trained for making propellers must know at least something about working in woods. Pattern makers and cabinet makers are welcomed as good material. They know their tools and can read blue prints, factors that make for a considerable saving in time.

Mechanics for the general airplane division are recruited from among carpenters, sail makers, tinsmiths, sheetmetal workers, ship riggers, flagpole experts, etc. The men chosen for transportation have usually been general garage men and employes of motorcar factories, such as chassis assemblers, final assembly men, transmission experts, axle men, steering gear experts, etc. Men with a fondness for the motor cycle are apt to be assigned to that department. Only blacksmiths are accepted for the specialized form of smithing that has to be done in the air service.

Chauffeurs of several years' experience and men who were general machinists by trade are found thruout the school, except in the blacksmithing division. The best motor mechanics invariably go to aero motor division.

The curriculum in each department is twelve weeks in length. The time is divided between ten weeks in the hangars and two weeks on the flying field as an apprentice member of a crew. The fact is, however, that a large number of the men complete the work in ten weeks. They save two weeks by the speed and efficiency with which they learn the new applications of mechanics put before them in the hangars. The course is outlined expressly to permit this speeding up.

Since the airplane mechanics' course is the most characteristic and enlists a large percentage of the men, it will be described in some detail.

It is the aim of the instructors in this department to impart to their men the whole working theory of the airplane in twelve weeks, so that at the end of that time they may be placed in charge of a crew if necessary. However, this qualification must be put upon the statement: the men are expected to know only the outside of the motor. The specialist has to step in whenever there is real engine trouble.

The first two weeks of this course are given in the main to woodwork, the woodwork of the wings being studied for the most part the first week, and that of the fuselage, or body of the plane, the second.

Note—The present paper was written in the fall of 1918 when the training of aviation mechanics was at its highest point. It is reproduced here exactly as written because of its historic value and because of the obvious suggestions which are offered for teachers and organizers of vocational subjects.

The first lesson or two deals with the properties of woods. A set of exercises based on parts of the fuselage are then assigned. Four or five pieces are made during the week. Since these parts are actually used in the repairing of planes, the students learn at once the standard woods and the standard dimensions. Two parts for the wing are also made. The student does a required amount of work on a wing itself, and also learns how to splice the long rods that form the frame of the fuselage and are called longerons.

Lectures intersperse the shop activities. The technical names for the various parts of the plane are a part of the week's assignment that comes in for attention in the lecture room. To assist in the acquiring of nomenclature, the student has access to a model wing with the names of all parts painted on them.

Sheer skill of hand is called for at the very beginning. Routine operation of a machine is practically eliminated from the whole course. In the first week the student must learn how to knock a wing apart and then put it together again. He has to cut "spacers" in two and then splice the pieces. He has to veneer the "leading edge"—that which cuts into the wind. And when a wing is ready for permanent assemblage, the soldier student has to glue and wire the parts into a strong unit. A pretty busy "first week of school," is it not?

The alignment of the fuselage takes a good part of the second week. For convenience of reference, the body is divided into three parts, which are given names. If an aviator, on returning from his morning flight, reports that his machine refused to go into a tail spin, the mechanic knows at once that the fuselage is probably distorted. It is up to him to find out in what section the trouble lies, and to correct it. This means that he must have learned how to loosen a wire here and tighten one there by the use of turnbuckles, and how to put on a turnbuckle by first threading the wire in a most accurate manner.

Then comes a lesson in patching the linen surface of a wing. Tho the women would probably be inclined to classify this as an application of domestic art, the men say it is using a bit of baseball technic. The baseball stitch is used in sewing on the patch, for it is the stitch best calculated to withstand heavy air pressure. To make the work more difficult and more typical, the instructor first sees to it that the rent is frayed on its edges. With the sewing done, a protective covering is glued over the patch and its seams. Unbleached Irish linen is the best material for patching a wing, but it is so expensive that the instructors here make an exception to using the actual material the men later will have to use in service, and substitute a cheaper stuff.

A lesson in propeller alignment is also given at this stage. This part must revolve absolutely true to the line marked out for it. The mechanic must know what this circular line is; how to ascertain whether the propeller follows it; if it does not, why not, and how to correct the defect—as beautiful and practical an application of mathematics as any scientist could wish for.

Metals and wires are the subjects for the third week. Three days are given to each. Topics are: making loops in and soldering hard and soft wires, splicing, making ferrules, adjustment of metal fittings, etc.

The motor is the subject for the fourth week. Altho the general airplane mechanic is not expected to be a motor expert, he must know the engine in its relation to the other parts of the plane and be able to remedy the more ordinary troubles. He studies how to install a motor and how to take it out, how to keep carburetor and magneto in working order, how to grind the outer valves, how to make the connections with the pilot's steering gear, and how to crank up. He must get the habit of seeing to it that the propeller, whenever the plane is at rest, stands on a horizontal line in order to avoid warpage.

The rigging of the plane is taught in the fifth and sixth weeks. But 85 per cent of the men complete the topic in one week. In the hangars devoted to this work the complete general technic of the airplane is taught. Lectures initiate the men into the principles of aero dynamics and the theory of flight. They are now required to know why as well as how. The charts illustrating these subjects were made in drafting rooms on the field.

At this stage the order of assembling the parts of a plane is learned. This is a definite procedure that must be to the mechanic as his A, B, C's. Alignment in landing gear is also treated here.

The last four weeks in the hangars are devoted to rigging and assembling combined. Three weeks is usually all the time spent at it, however, so that the saving of a week here, combined with the elimination of the sixth week as outlined, often sends the mechanic to the flying field the ninth. The planes which constitute the bulk of the laboratory material for this stage are knocked down and set up again twice a week during the four weeks. In the closing days of their course the men set up and rig Curtis ships that are afterwards put in flight while the mechanics gaze on the marvel of their handiwork.

The two weeks on the field as a member of a crew do not appear strenuous to an onlooker when he observes the crew lounging about waiting for the pilot to return from a long flight. But he is apt to forget the mechanics arose before daylight to bring the ship out of the hangar and give it its final "once over," and that they will have to work late that night if the flight reveals any serious defect in its mechanism. When these two weeks are finished the graduate is ready for regular service as a squadron member on some American flying field, with a good chance for European service later.

The course for propeller makers is more highly specialized than that just described. In fact, propeller men are specialists in every sense of the word. Besides

this, they must possess superior all-round ability. When they are finished off, only one is assigned to each squadron. They have to learn more theory than any other men in the shops. They must know woods, for the kind of wood that makes the best propeller in one climate will not serve in another. In this country, for instance, it is poplar in the South and mahogany in the North. The propeller expert must know how much seasoning to give his wood, just what temperature it must have before being glued, and how to attain that temperature without injuring the wood; then how to glue the several parts together in a press, the manipulation of which is something of a trick. He studies certain charts on the pitch of the propeller, others on its length, and still others showing the combinations of these two factors. He refers hundreds of times to a large chart on the properties of many kinds of woods, their elasticity, weight, strength, etc., and every officer and instructor put over him is himself an expert and can make a better propeller than any enlisted man in the shop.

In the motor-truck school two weeks are given to the study of the engine. The total time is the same as for the other departments. The course is about the same as that in commercial motor schools, except perhaps for its greater intensiveness and rapidity.

In all courses care is taken not to overemphasize theory, while at the same time it is insisted that practice be intelligent. Practice, of course, is accorded the larger share of the time. Everywhere there is a close weeding out of nonessentials.

The grading system is rigorous. A grade sheet for each class is made up every day. There are several ways of checking a student's work. A complete record of grades for the course is kept. Eighty-five per cent is the minimum passing grade. An examination is given at the close of each week's work. Men who receive two weekly grades below 85 are required to repeat the work up to the point of the second failure. If this does not straighten out their ideas and practice they are sent back to the Trades' Test Board, which is expected to find out what the trouble is, and in case it seems irremediable, to assign the men elsewhere. Only five per cent of these soldier students are failures.

Corps spirit is not neglected. Officers and instructors aim to imbue the men with the feeling that they are integral parts of the air service, that branch of the service on which rests so much glamor. They wish them to know that their labors are just as essential as those of the aviator himself. With this end in view, the commanding officers hoped, at the time these notes were made, to be able in the near future to allow each man to make at least one flight. Many of them later, as members of crews, would have this privilege, but to others the opportunity might not come at all.

The government itself holds out a real incentive to these mechanics in the form of a 27 per cent increase in their pay at the end of their course. They are given the ratings of airplane mechanics or aviation mechanic. To attain these ratings they must pass an examination on airplanes, motors and ignition.

Sergeant of the first class and master signal electrician are further honors that await industry and intelligence above the average. One must have attained the grade of sergeant before being eligible to take the prerequisite examinations. The number of such awards in each squadron is limited.

To be a sergeant of the first class in the air service means something—much more than the layman would suspect. It means the man holding this ranking has passed what some officers assert is the most difficult examination in the army. He must have a good working knowledge of nearly all phases of military practice. The plane, its engine, ignition system, etc., are the very elements of his mental stock. He must know wireless and all forms of signaling, the various lighting systems, photography, the infantry drill regulations, general army regulations, just what clothing equipment a soldier is expected to have, a sergeant major's paper work, etc. All the senior instructors in the E. M. T. D. are sergeants of the first class.

A master signal electrician with an aviation mechanic's rating actually earns more, despite the apparent discrepancy in salaries, than a first lieutenant, and nearly as much as a captain. If it happens that a first lieutenant's meals cost him 50 cents each, his actual is $26 less per month. The master signal electrician is expected to have much of the personal qualities demanded of the officer, such as talent for supervising the work of others and the power to command the respect of his men.

Still another recognition of merit is appointment to the corps of instructors. Even a buck private may be so honored, but once appointed he usually rises rapidly. This, of course, is due to the fact that only superior men are chosen. Besides his technical knowledge, the appointing officers make sure the candidate has the knack of imparting his knowledge to others. Unless this be the case, the man's otherwise high attainments are utilized elsewhere. Instructors are promoted by the merit system only, which system is said to work as a very real incentive.

On Sept. 1 about 180 men wore the white bands on the arm that marked them out as instructors. This number was to be increased shortly to 400, so as to make possible the training of 3,700 mechanics at one time.

The previous training of the officers in charge of such a school as this has its pedagogical bearing. Generalizing, one may say that every man is highly trained and is a specialist, but no two have had similar sets of experiences. The most of them acquired their specialized knowledge by following some line of business or artisanship that attracted them.

Maj. George E. Stratmeyer, commanding officer, was with the Union Pacific in 1914. Entering the army by way of the infantry, he became a military Junior aviator

before being given his present appointment. Capt. Edward C. T. McShane, officer in charge of instruction, was a New York motor engineer who afterwards engaged in a general automobile business. But aviation was always his hobby. He had a wide acquaintance among the prewar flyers, and in his eagerness for a flight he once sat on the edge of the wing and held to a spar. Lieut. C. T. Moors, in charge of the aero motor department, was in the automobile business in San Francisco. The officer in charge of the transportation department, Lieut. L. C. Lichty, was professor of mechanical engineering in the University of Illinois. Lieut. J. F. McCarthy, in charge of the rigging classes, left the employ of a motorcar manufacturing firm to work for an aeroplane company, to which his interest in aeronautics attracted him. From this work he went to the aviation officers' training school at Atlanta. Lieutenant Kelly owned a manufacturing machine shop and was interested in experimental machinery. Lieut. D. C. Cady, commanding the wood, wing, and fuselage work, saw nearly every phase of railroad life from the inside. Lieut. H. Robertson, in charge of the propeller making department, combined the trade of machinist with a genuine talent for song and the roving disposition of a soldier of fortune.

Lieut. F. G. Biliker, in charge of metal work, was present at the birth of the United States Air Service. That was when General Pershing took a few wobbly planes along in his pursuit of Villa. Because he had already shown himself to be a "natural-born" mechanic, Mr. Biliker was made a member of the first aero squadron and put in charge of a movable machine shop, of which the entire equipment was carried on one truck. So comparatively unskilled in their art were the flyers that his outfit carried more landing gears than all other equipment put together. Rather curiously, ten of the men who made up the personnel of that traveling machine shop are not captains.

The French government has shown its interest in this unique school system by causing Major Henri Douriff, a pilot attached to its organization service, to make a thoro inspection of its working preliminary to a report to the Paris authorities. "It is simply wonderful," was his comment following his inspection.

A summary of the pedagogical principles and practices illustrated in this school, whose supervisors are not schoolmen, may be permitted. All practice is as directly to the point as possible. Theory is immediately illuminated by practice. Speed is gained thru the elimination of preliminaries and nonessentials and thru a flexible promotion system; a definite and visible progression; rigorous grading system, including much emphasis on examinations; substantial incentives; the constant appeal to the eye; analysis precedes synthesis; the hand more important than the machine; interest and the sense of responsibility appealed to; artificial standards for the choice of officers and instructors replaced by the form of aptitude and pertinent experience; curriculum outlined in detail.

CALIFORNIA'S TRAVELING TRACTOR SCHOOLS

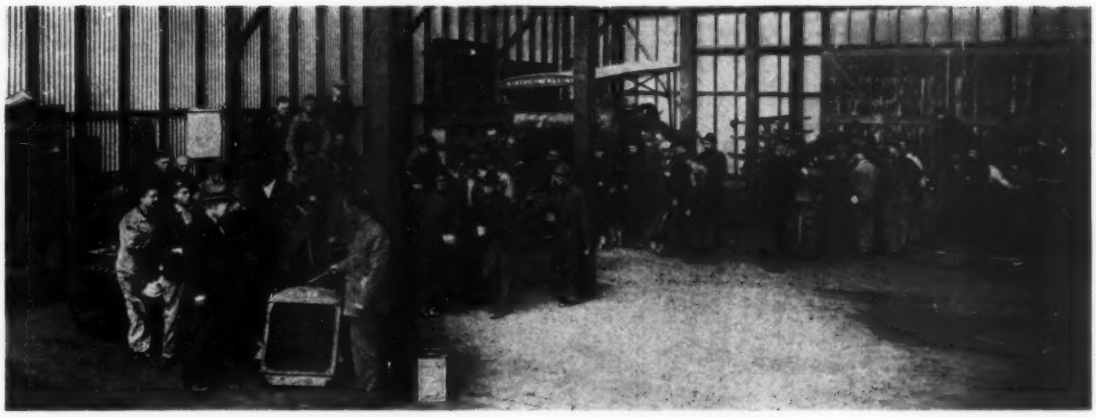
J. C. Beswick, Director of Vocational War Work, Sacramento, Cal.

DURING the months when the country was bending every effort to meet the demands placed upon it by our entry into the world war, educators from coast to coast philosophized considerably on the benefits to be derived thru the quickening of the educational pulse. Now that the country is emerging from the stress of the war it is timely to take stock of the fruits of our endeavors in various lines of activity. Just a sidelight on one activity may be afforded by a description of the traveling tractor schools established by the California State Department of Education.

The imperative need of meeting war conditions and the urgent calls for practical assistance thru the schools, resulted in a survey of local conditions in California by a war emergency department of the state board of education office under Dr. E. R. Snyder, Commissioner of Industrial and Vocational Education. One problem that loomed large from every aspect was the need of training men in tractioneering as a means of securing increased food production which appeared imperative. California's climate and wonderful agricultural resources are particularly adapted to increased food production, in fact, crops can be raised the year around. The state was, however, confronted with a great shortage of labor which interfered with the working of enlarged farm acreage. It was believed that this shortage of labor could be largely offset by the increased use of tractors on the farms and ranches of the state.

The immediate difficulty of the increasing use of tractors arose from the war. Most of the young men were called, or were about to be called, for military service and the older men did not understand the handling of tractors and were not buying them because they could not get operators to handle and care for the machines. It was also found that in the smaller communities no courses were being offered in mechanical and technical lines that would supply the type of instruction necessary for training men.

As a result of a survey of the state, it was decided to establish training centers in tractioneering in the small communities for the benefit of farmers, farmers' helpers and other persons engaged in non-war work. The courses were also to be offered to young men who might be called for the tank, tractor or motor corps of the army. A report embodying the plan for the centers



CALIFORNIA TRACTOR TRAINING CENTERS, UNIT NO. 2.
This picture shows a corner of the training center where the learners are disassembling and assembling tractors, and repairing tractors brought in by farmers living in that district.

was approved by the chairman of the State Board of Control and an allowance was made from the emergency fund of the state to carry on the work.

As a preliminary, a meeting was arranged between the Department of Vocational Education, the State Board of Control and the manufacturers of tractors and representatives of manufacturers at Sacramento. The immediate result of the meeting was the formulation of a pledge on the part of the various tractor concerns to loan the State Board of Control and the State Board of Education approximately $60,000 worth of tractors and farm machinery to be used in this educational work.

About the same time, thirty towns which are natural centers of large and varied agricultural districts were selected as training centers. The selection was made on the basis of the probable production of food which each community could insure in the territory adjacent to it. The local organization of the school was planned to be worked out in cooperation with the high school principal and the local board of education. The principal was chosen in each case to act as director of training and to form the link thru which the cooperation of the Chamber of Commerce, the Farm Bureau, the Council of Defense and other organizations representative of the district was to be obtained. As directors of training the principals handled all advertising necessary to put the project before the people and made all business arrangements concerning housing, etc. They arranged also for the use of acreage, to be plowed as a part of the field work during the last week of the course.

About a month before the scheduled date for the opening of the center in the representative communities, the entire business arrangement and local organization were discussed in detail with the principal by the director of vocational war work and state supervisor of agricultural education, who acted in a sense as advance agents of the Department of Industrial and Vocational Education.

The thirty centers were grouped into three units, known as unit one, unit two and unit three, with ten centers each and a complete traveling organization was made up for each unit.

The equipment for each of the traveling tractor schools consisted of about $20,000 worth of tractors and farm machinery in charge of two expert instructors. One of these men devoted himself to gas engine work and the other to tractioneering proper. In a number of centers, however, the work was so much heavier than originally planned, due to the large number of students, that additional instructors were put on.

The schools were genuine schools on wheels. The equipment moved from center to center on flat cars and it was an unusually interesting sight to see the train loaded with engines, plows, tractors and other machinery roll into a farming community on a Monday morning. The schools entered not only into the agricultural districts of the state but from all indications into the hearts of the farmers. There was always an escort of eager and enthusiastic townspeople to watch the unload-

CALIFORNIA TRACTOR TRAINING CENTERS, UNIT NO. 1.
This picture shows the students at work, assembling and disassembling gasoline engines, during the second week of the course. The theory and principles of the gasoline engine were given during the first week of the course.

CALIFORNIA TRACTOR TRAINING CENTERS, UNIT NO. 2.
Staff Instructor of Tractioneering lecturing on the disc plow, and correct hitching to tractor. This tractor and plow are a part of our equipment carried on flat cars in Unit No. 2.
Each and every learner is taught how to disassemble and assemble and to drive and operate each make of tractor carried in the unit as well as the number of tractors sent into each center by local tractor representatives.

ing of the equipment and to accompany its transfer to the training center.

The courses were organized to give practical instruction during a period of three weeks—six hours each day and two and one-quarter hours each evening. In all, two thousand men have been trained to operate and care for tractors in the thirty centers.

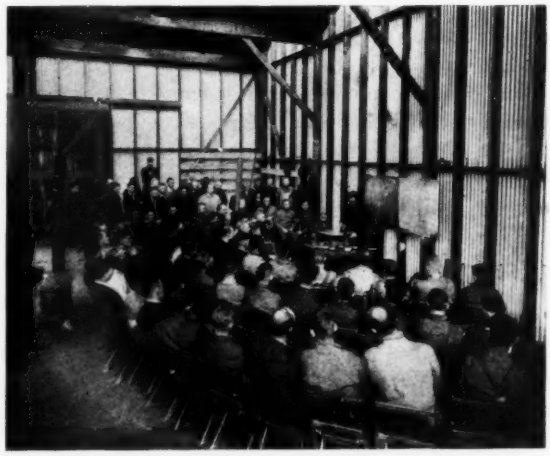
The first week of the course was devoted to principles of gasoline engine ignition, carburetion, timing, disassembling and assembling gas engines. During the second week the classes were divided into two groups. The gas engine instructor gave practical instruction on the gas engines, and the tractor instructor disassembled certain parts of each tractor and worked out practical problems with the students. The third week was given over particularly to the field work. The purpose was to teach the learners the actual operation of the tractors and the scientific handling of plows.

During the last week in the field, the instructors devised as many "trouble shooting" problems as practicable. Without the knowledge of the students, for instance, the wires on the magnetos were changed and the students were required to diagnose and to remedy the trouble. Distillate was put into squirt cans, instead of gasoline, and many a learner scratched his head in perplexity after a complete inspection of the engine. As a conclusion, once and for all, it was evident that a tractor will not start on distillate. Sometimes the adjustment of the hitches of the plows was changed and the learners were required to connect them to work correctly.

The tractor training met with a good deal of enthusiasm in practically every center where the work was established. In nine out of every ten centers, students have had to be turned away because the enrollment exceeded the facilities. The course is very practical and its novelty proved to be no small element in attracting visitors who were surprised and impressed with the work and its possibilities.

In each center a building, usually a garage, was arranged for lecture and demonstration work. Chairs, a blackboard, etc., were provided for the lectures and recitations and the tractors and engines were so lined up as to make demonstrations and practice work easy.

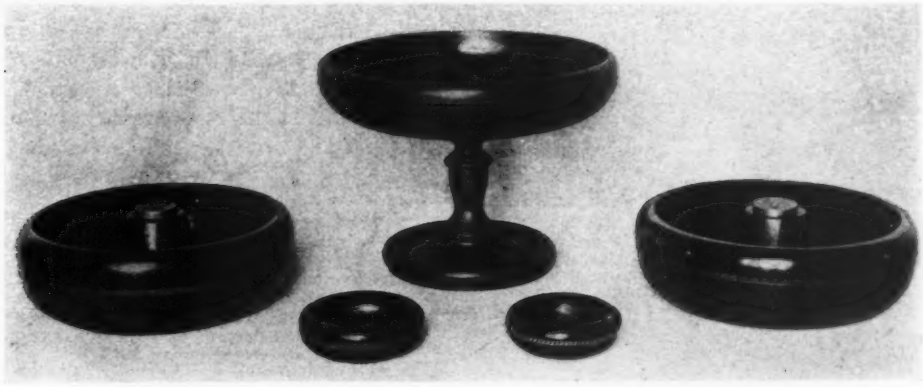
California is the first state to undertake an educational project of this sort as a part of high school work, bringing a practical school and complete farm equipment in the rural communities to meet an immediate need. It is hoped that the state legislature will appropriate sufficient funds to enable the vocational education department to enrich and enlarge the course and to offer similar much needed training under the supervision of the Commissioner of Vocational and Industrial Education. It is planned to bring mechanical and technical instruction in this way to at least two hundred rural high schools which are not equipped for such work and cannot afford to hire expert instructors to give special vocational courses.



CALIFORNIA TRACTOR TRAINING CENTER, UNIT NO. 2.
This is a lecture on the theory and principles of the gasoline engine during the first week of the course. This training center was held in a building that at one time was used for manufacturing purposes. There were 144 students enrolled at this center.

THINK out new ways; think out new methods; think out new ways to deal with old problems. Don't always be thinking of getting back to where you were before the war. Get a real new world.

—*David Lloyd George*



TURNED AND INLAID FRUIT BOWL, NUT BOWLS AND TRINKET TRAYS.

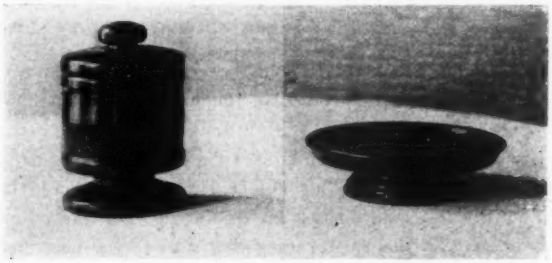
Inlay Applied to Turned Wood for Decorative Effects

Joseph C. Park, Oswego, N. Y.

THE process of setting materials into one another for decorative effects is known as inlay. This method of decoration is very old. The materials most commonly used are metals, wood, stone, and ivory. Metal inlay was quite common in ancient art and is supposed to have originated in the ancient city of Damascus. Stone inlay is even older than metal inlay and belongs to the field of mosaics. The origin of stone inlay is unknown. Inlaying ivory into wood was also practiced extensively by the ancients. Various forms of inlay have been found in almost every period of art. In showing the wide use of inlay by the ancients, Richard F. Bach says, "One period chooses metal, another best handles stone; yet a third achieves fabulous splendor in wood, far outreaching all other types in combination of this material with bronze, tin, mother of pearl and tortoise shell. Again while one race restricts itself to the simple contrast, say of ebony and ivory, another favors the more complementary color gradations obtained by staining woods of many kinds." Thus, inlay has a wide use for decorative purposes all thru history.

It is not the purpose of this article to discuss the history of inlay, but to show how inlay may be used to advantage in the school wood shop. The use of inlaying of lines and borders of Sheraton furniture and the use of inlaid centerpieces such as seashells, sunbursts, and wreaths in other manufactured articles of certain school shops have grown to be quite popular. This article deals more especially with inlay as applied to wood turning. Vases, bowls, and jugs in Indian, Egyptian, and Grecian art not only depended upon shape for beauty but border designs were applied to these beautiful shapes. These border designs were carefully worked out, rhythm and balance being the controlling principles. In wood turning it is possible to apply the same principles by means of inlay applied to nut bowls and various other articles turned in the school shop.

In the double compartment nut bowl, the inner compartment is used for shucks and the outer compartment for nuts. Note the height and thickness of the walls between the compartments. The anvil in the center is turned in the machine shop from a piece of cast



TURNED JEWEL BOX AND CARD TRAY.

TURNED NUT BOWL WITH DOUBLE COMPARTMENT.

TURNED CENTER TABLE.

iron and then nickel plated. The hammer used in cracking nuts on this anvil is a No. 37 planishing hammer. Note the inlay of this bowl as to design. Note its position above the bottom and below the top. Inlay such as this may be purchased in strips about 30″ long and ⅛″ thick, the width depending upon the design used. The width of this particular strip was ¼″. In applying inlay on turned work like this proceed as follows:

1. Turn the bowl down to the desired measurements ready for sanding.

2. Lay off lines bounding the inlay.

3. Use parting tool and cut grooves the exact width of the inlay. Cut deep enough to allow the inlay to project just a shade above the outer contour of the bowl. Use a piece of the inlay to test the accuracy of your work.

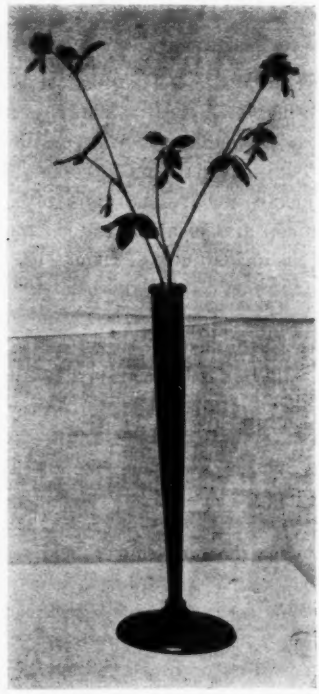
4. After the groove is cut, glue in the strip of inlay. In doing this apply a little glue to one end and clamp in place. Apply a little more glue to the groove with a toothpick shaving and press strip of inlay in place as glue is applied little by little. Press with the left hand and apply the glue with the right hand. Press the inlay into place around to the clamp. By this time the clamp can be removed long enough to cut off the end of the inlay to the exact length. Glue and clamp in place, clamping over the joint thus holding both ends of the inlay.

5. After the glue sets, remove clamp, scrape inlay down carefully, and sand.

6. Finish and polish bowl in the lathe.

Various inlay designs may be purchased from the following firms: George H. Jones, 407 Second Ave., N. W., Cor. 23rd St., New York City; Ohio Veneer Co., Cincinnati, Ohio; J. B. Bernard Co., 422 E. 53rd St., New York City.

TURNED BUD VASES. TEST TUBES ARE USED FOR WATER WELLS.

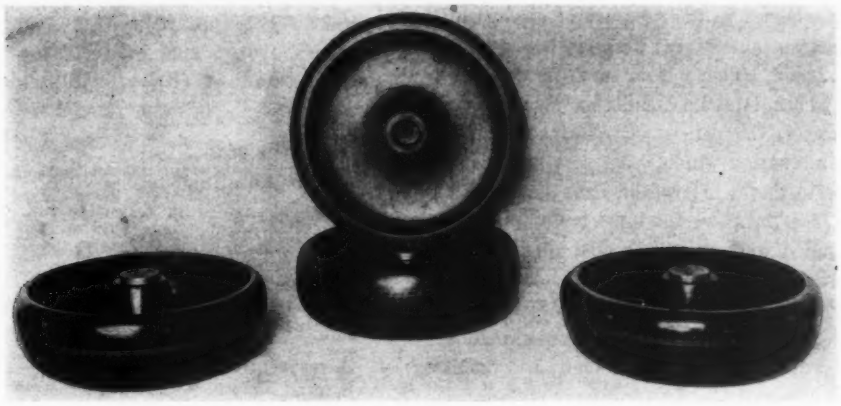


TURNED BUD VASE MADE IN THE AUTHOR'S CLASSES.

The illustrations show various designs of inlay. The two outer bowls have the Egyptian zigzag inlay, made of ebony and white holly. These bowls are all turned from black walnut.

The bud vases are turned in two parts. The base is turned on a face plate and the shaft is turned between centers as follows:

1. The stock for the shaft is 1½″ by 1¼″ square and desired length, say twelve inches. Draw diagonals for center on each end. With a drill the size of an ordinary test tube drill hole for test tube in shaft, using drill in an engine lathe. This hole must be deep enough to allow the test tube to rest on its flange when placed in the vase. Turn a false center that will fit the hole and place in wood turning lathe and finish.



INLAID NUT BOWLS.

2. Polish shaft and base separately in lathe, then glue parts together.

The center table shown is 29″ high; top 28″ diameter; base 22″ by 22″. It is made of black walnut with an inlay border in the top.

Wood turning is seldom given as an isolated course. In most schools it is given in connection with pattern-making or period furniture construction. Inlay applied to projects similar to those described will add much interest to the work. It will help to develop technique in the use of the wood lathe, and is therefore a valuable means in helping to master the lathe tools in connection with pattern-making or in the construction of period furniture.

Aniline Wood Stains: Their Uses and Limitations

Ralph G. Waring

MORE and more frequently am I asked: *"Why should I use water stains? Don't they raise the grain?"*

In that last question I really believe lies the crux of the eternal *why* and *wherefore* as to the lack of incentive or perseverance among manual training and industrial instructors in general to learn about the use of stains and proper materials and methods. Some one has told them that the application of a water stain raises the grain and that possibly means more sanding; so the matter is dropped. Only occasionally does an instructor pursue the matter further and get at the truth. Again, I have heard more than one instructor say, "Oh well, if you want to work that hard all right. What comes out of the bottle, or can, is good enough for me." I wonder what kind of work and pupils these men turn out annually!

Fundamentally, it is absolutely necessary that the *grain be raised,* if a creditable job of staining is to be done. For that reason it is desirable to sponge all cabinet work with water first, let dry, and sand smooth. In this manner the pores are opened, the stain penetrates quickly and leaves a clear, transparent color which the varnish coats magnify and enhance.

Contrast this with the work of spirit or oil soluble materials which never go into solution in the sense that common salt, for instance, dissolves in water. Spirit and oil soluble colors are infinitesimally small in the division of the dye but at the same time these particles are in *suspension* and not in solution. This will explain why oil and spirit stains remain on the surface of the wood, *"piling up"* as it is called under repeated brush strokes. As a matter of fact I have had first class finishers of years of experience, working for me, who could not successfully do one stroke of spirit-stain work and not pile up the color. When this occurs of course bronzing of the color appears, i. e., so much material remains on the surface as to cause a greenish-bronze glaze of iridescent colors peculiar to this class of stain. Obviously it is next to impossible to secure a clear finish over such a foundation. When shellac is used it will immediately start to *"lift"* the color and the work soon becomes streaked and blotchy. Then too, when the varnish coats are applied eventually the stain will *"bleed thru,"* owing to the fact that the stain and varnish are interacting; so that the fatty acid of one is combining with basic material in the other, thereby destroying the finish. Please remember that the sample panels, of firms supplying spirit soluble stains, are manufactured under ideal conditions; by men who know *all* the tricks of their trade, and then you will understand why it is next to *impossible to match* your work with theirs, when using the same materials. Lastly, spirit and oil soluble colors in general *are not permanent.* After application, such stained work must be stored in the dark; or immediately finished up by shellacing or similar treatment. Sunlight is one of the most powerful reducing agents known to chemists, and since most woods contain appreciable amounts of acid, dye materials of this type are

Editor's Note—The present article has been suggested by a recent question from a manual training supervisor and from frequent observations of confusion in the minds of manual training men concerning the relative merits of stains.

frequently basic. Hence in the presence of strong sunlight, chemical action takes place; the color breaks down and eventually fades. There is a bank in Syracuse, N. Y., panelled in beautiful East India mahogany. Unfortunately, however, the panels were stained with an oil and spirit combination which when new was beautiful indeed. Due to the fact, however, that the majority of these panels face the powerful light from the street they have all faded and streaked; changing from a beautiful red brown to hideous yellows, blacks, greens, and off-shade streaks. This too, is true of the birch architrave and cove mouldings which were stained to match the panel work. Knowing these facts, and understanding as I do the basic reasons for their occurrence, you will readily see why I place small faith in the biggest selling argument the spirit stains possess: "This stain will not raise the grain, being an oil soluble color."

This, then, brings us back to the question of water stains, which when properly prepared are true solutions. There are, however, certain phases of their chemical nature which must be taken into consideration. Fundamentally, water soluble colors are acid, basic, or neutral in their chemical composition. It is preferable that only the direct, or acid colors be used, because they are the most desirable. Occasionally it will be impractical to mix two acid stains due sometimes to an excess of lime or magnesia, which precipitate their respective insoluble salts. For this reason it is necessary to buy only the concentrated colors available, since they will have been most carefully prepared.

In the following lists of colors available for wood stains it is possible only to mix those marked either acid (a), or basic (b). Do not attempt to get any shade by mixing two colors marked (a) adding one marked (b) in which case entire loss of all colors will result.

Wood Stains and Their Solutes.

I. Colors soluble in water only:

Acid brown (a).	Fast red (a).
Nigrosine (b).	Wool red 40F (a).
Silver Gray (a).	Wool yellow X (a).
Brilliant scarlet (a).	Wool blue (a).
Quinoline yellow (b).	Wool black (a).
Azo acid yellow (a).	Rose bengal (a).
Orange 2R (a).	Nigrosine OP (a).
Acid black.	Ponceau (a).
Fast blue (a).	Azo rubine (a).
Sulphur brown M (a).	Azo blue (a).
Mahogany brown (a).	Azo violet (a).

II. Colors soluble in water and spirit:

Methyl green (b).	Magenta (a).
Methyl orange (b).	Napthol black (a).
Chrysoidine (b).	Napthol green (b).
Aurantia (a).	Picric acid (a).
Napthol yellow (a).	Eosine group (a).
Malachite green (b).	Methyl violet (b).
Bismarck brown R.&Y. (b).	Methyl blue (b).

III. Colors soluble in spirit only:

Nigrosine s. s.	Blue s. s.
Malachite green base (b).	Rosaniline base (b).

IV. Colors soluble in oil:

1. Oil yellow 2625 N. A.
   Amido benzol and toluol.
   These change from yellow to red in acid solution.
2. Oil yellow T. N. A.
   Aniline azo phenol.
   These change from yellow to red in alkaline solution.
3. Chrysoidin base.
   Sudan.

Reds:

Oil red O. N. A.
Oil scarlet 69 N. A.

Browns:

Oil M. N. A.

NOTE. The abbreviation N. A. following a color represents the National Aniline Co.

Colors may be obtained from: Central Dyestuff and Chemical Co., Newark, N. J.; National Aniline Co., Buffalo, N. Y.; Walter K. Schmidt Co., Grand Rapids, Mich.; Marden, Orth, Hastings Corp., Hoge Building, Seattle, Wash., or Chicago, Ill.

The soluble limits of these colors in general approximate four ounces to the gallon of hot water. Avoid hard water whenever possible, because of the presence of iron, lime, and magnesia which precipitate their insoluble salts with *much* loss of color. The different shades of colors may best be found by treating sanded basswood or poplar panels with one ounce solutions of the color. In this manner it will be easy to judge the colors necessary to mix for any desired shade. In determining the absolute formula it will be necessary to apply the color to the wood to be used in the finished piece since it is obvious that the effect will be quite different on oak and basswood, for example. The only necessary precaution in storing the prepared stains is to keep them in glass or earthenware jugs since their acid nature would tend to cause them to attack metal containers.

One of the results of my last year's work in the research laboratory has been the development of a wood stain from the mine water waste from bituminous coal mines. This material is washed, purified and dried and ground in a very concentrated form. As I have developed it for wood stain I have named it Universal Brown. It produces beautiful shades of fumed oak on practically all woods whether oak, basswood, cypress, birch or beech. Its cost per gallon of prepared stain is less than that per half pint of commercial spirit stain, is absolutely permanent and *does not raise the grain* after the first sponging, which often happens with aniline stains, altho it is in water solution. It may not be mixed with acids or acid salts, like potassium bichromate but may be mixed with ammonia, sal soda, etc., to pro-

duce shades of much clearness and beauty. As a matter of fact it is now being used in ton quantities by the manufacturers of wall paper to whom it is especially useful in the coloring of "oatmeal" papers which are essentially surfaced with sawdust. Its use as a stain in reality replaces the method of fuming since it exactly produces the effects heretofore peculiar to oak exposed to the fumes of ammonia, thereby doing away with the necessity of fuming box and other space consuming equipment.

From the viewpoint of cost per gallon, aniline water stains are the cheapest on the market since water is practically free of cost; the anilines are concentrated and are capable of producing four or more gallons per pound of color. They are more easily applied than oil or spirit colors, do not pile up, are quite proof against fading since they may be mordanted or "set," and do not bleed thru the finish. In commercial practice very few companies use oil stains except in the very cheapest work when the oil stain and filler are worked as combination coats. All of us, I think, admire the beautiful clearness of new piano work. Such colors are all water stains which alone can produce clear toned shades.

A sample specification then for mahogany would be:

1. Sponge, dry, sand with 00 paper.
2. Brush or sponge on hot stain coat, dry 12 hours. *Do not sand.*
3. Shellac sizing coat half alcohol, dry 6 hours, sand 00.
4. Fill, clean up, dry 48 hours, sand 00 to clear up if necessary.
5. Dust off, varnish one coat No. 61. Dry three days, sand 0000.
6. Clean off with tacky cloth. Varnish 1 coat No. 61. Dry three days. Rub with F pumice stone, felt pad and water.
7. Clean off with tacky cloth. Varnish 1 coat No. 61. Dry three days. Rub F.
8. Clean off with tacky cloth. Varnish 1 coat No. 61. Dry three days. Rub F.

Or let harden over night, after rubbing, polish with rotten stone.

9. Clean up with good oil polish.

If we, as instructors in trade school work, intend to do our part toward replacing the old apprenticeship system it is necessary that we stop getting our finishes "out of a can." A man may be able to spread prepared paint, ready mixed, but if he cannot match the shade with materials on the job, then I do not consider him a valuable nor a properly trained journeyman. On the other hand, if we can teach the boy in industrial work, the fundamentals of color matching and production, something of the necessary precautions, the proper methods of handling, then we have taught that boy something worth while—to think for himself when he gets away from our shop.

SCHOOLING IN SERVICE

Willis B. Anthony, Director of Practical Arts Department,
State Normal School, Fitchburg, Mass.

THE stranger in our city was standing on Main Street with two unexpected hours at his disposal. He inquired of two boys coming out of a bank about the city's chief points of interest. They directed him to the new government post-office, the armory, and other places of attraction common to all cities.

"Let's ask him if he wants to see the school," said one of the boys as he looked back and saw the stranger standing indifferently on the curb where they had left him. They returned. Their interest in their school interested him. "Well, boys, I am from the doubtful state and in a doubtful state," laughed he. "Show me the way."

At the entrance of the main building of the State Normal School in Fitchburg the visitor was met by a boy dressed in green livery fronted with brass buttons, who took his hat, coat and belongings, and returned with a check. Thinking the boy was hired for the purpose the stranger offered him a tip. The boy wouldn't take it, saying that he was a school boy in service, giving his share of time as a messenger.

"Upon learning that I was leaving by train," the stranger told us later, after the messenger had ushered him to the office door, "the little lad in green coat and brass buttons offered to telephone and find if my train was on time. He said he would arrange for a taxi and spoke as if I might decide on a later train after I had started looking the place over. Visitors sometimes had him look up the next train before they got thru with the school, and he would do it for me."

We entered a large room where twelve to fourteen year old clerical workers were doing parts of the large amount of business reading, writing and arithmetic, which is always necessary in running so large an educational plant. The room is divided into three sections. Thirty typewriters almost rattle the glass partitions of the first section.

"What's this boy doing?" asked the visitor as he sat down beside a checking machine. "Paying our debts, sir," the boy replied, as he handed over a pile of official looking papers which he had copied, with an occasional help from his teacher, from a list which she had given him. "What! Do all of these mean real money?" was asked. "Indeed they do." A few weeks before another boy serving his turn with his checking mate at the

1. This shop was formerly a school attic. "Keep it locked in the presence of visitors" was the order, which suggested that the place was not fit for the public eye. It was the ordinary waste room where wasted odds and ends were stored. Clean-up days brought about a desired change. A new floor was laid by the boys and men. A shop was made. It was dedicated four years ago by making window frames for the basement of the new green-house. Visiting parents now ask first of all to be shown to the shop where big improvements in boys and surroundings have been made.

machine had made out as part of their regular work a check for $49,500.00 of real money to be paid to a local contractor for his work on the new dormitory. The little fellow's hand never trembled and it is easy to believe that the decimal points were all in good standing. These points were allowed to carelessly slip neither one or two places to the left or right. The boy knew that such a mistake would make a difference to the contractor and to the State of Massachusetts and besides such a break would "queer" him and the commercial department of which he was a member.

Years ago we got check writing as a finishing touch before entering high school. Such decimal days caused dismal stays after school. When those checks were finally all done, the best of them beautified the bulletin board and the rest of them beautified the waste places. To the best of our knowledge those in the waste places were more useful than those on the board. They were emptied from the waste boxes into the fire boxes where they helped the janitor start his morning blaze.

Shut off from the noise of industry made by the typewriters are two telephone booths. One is for private calls. The other contains the school's switchboard. This switchboard is operated by a "hello girl" in her earliest 'teens. She serves her share of time in answering the signal lights which wink on and off. She plugs in connections according to the call for or from any one of the twenty telephones on the property.

At the opposite end of the room are five hundred post-office boxes where twelve to fourteen year old nieces and nephews serve their Uncle Samuel in sorting and delivering the morning and afternoon mail. Proud of his suit of official gray the postmasterling stands behind the iron grill serving his turn at the delivery window.

Between the post-office and the telephone section there is a large business counter where paymasters and tellers handle money, ring the cash register, write receipts in duplicate, and sell supplies. Visitors cause no distraction. Doing work on a cash and credit basis, operating the filing cabinets and the adding machine, or the posting of loose-leaf ledgers, necessitates business like concentration. The juvenile workers have become accustomed to strangers just as they have accepted the expressman, the telephone inspectors, and demonstrators of new office equipment, as associates in every day work. There is a welcoming nod of recognition for all and the work goes on.

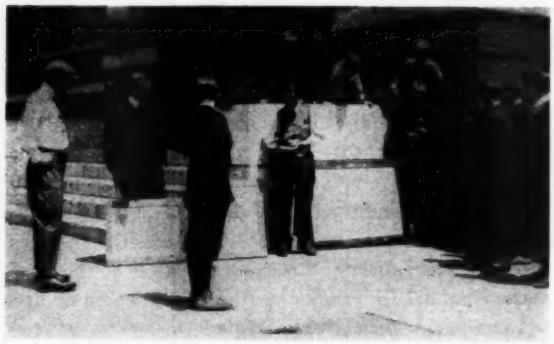
The visitor decided to take the later train and agreed to speak at assembly after lunch.

"I have seen boys doing things today, which I had to play hookey to do when I was in school. I have seen boys using benches and girls using cooking tables, which your earlier boys of nine years ago helped to build. I have seen boys binding school magazines and repairing their school books. I have seen samples of all the printing that has been done. I learn that those tennis courts were school made and saw you learning how to use them."

"What do you suppose happens when the faucet leaks in my house? My wife tells me and I tell the plumber. He comes out from the city and I pay the price. I understand that when your school pipes freeze and the faucets leak that these boys are guided in locating the trouble and help make things right."

"I have talked with tradesmen on your faculty who work with you. I also find there are young journeymen and high school graduates, sixty in all, who have given up their jobs for the sake of being students at this institution. I have seen these young men students at work in their own classes and with their own classes of boys, training to be teachers of this practical arts work with the boys of other towns and cities. I have been laughed at for taking some of the large boys in their overalls and jumpers for these young men and your faculty tradesmen. You all looked alike and acted alike.

"When I reached this assembly the hall was dark. Four tremendous big acts were going on in that moving picture booth of yours. The whole plot was as bright



2. Our best venture in furniture making was that of furnishing all parts of the new dormitory. "It can't be done" was the warning which greeted the proposed plan of assigning this work to the school's entire force of boys, men students, and the faculty, who were former tradesmen. In spite of the prophecy of failure, the designs, drawings, and specifications were successfully made. Hand tools and machines were taxed to the capacity of their appetites for hard and soft wood. "Make blue-prints while the sun shines" was the order happily followed by sons of toil who assumed successfully the responsibility of producing good looking and serviceable reception room furniture.

as day on this screen before you. I find it hard to realize that I am visiting school. I fail to find where running this place as a business stops and where running it as a school begins."

The klaxon of the speaker's taxi interrupted his talk.

Some weeks later my telephone rang. The little "hello girl" at the switchboard had connected it with a long-distance call. It was the visitor who had come among us as a stranger. I recognized his voice. "I have told my home friends about these boys and girls and they won't believe me," said he. "Come down and give us a club talk. I want you to prove to them that I have been a truthsayer in this matter."

I consented and asked if he would write some of the things we had talked over about the proposed trip, so that there would be no misunderstanding.

A day or so later I was passing thru the entrance hall. The "gray coats of mail" were distributing the letters, papers and parcels. On my return I asked the postmaster for the valentines in my box. He smiled and with business like dispatch brought them to me. There was the expected letter of invitation from the visitor's club of doubting Thomases. In return it called for an answer.

Next to the desk in my office is a smaller desk, on it a typewriter. Behind the typewriter that morning was a little fourteen year old lady, known as "my assistant." I asked her to lay aside the work she was copying and to help me answer some letters. She quickly took the copies from the machine, arranged them in her desk box and slipped in some correspondence paper with a carbon sheet. She then adjusted her chair, drew a long fresh breath, changed the angle of the huge butterfly of blue ribbon perched on her head and finally when all was ready turned toward me her face, from which beamed the unmistakable expression, "I am prepared."

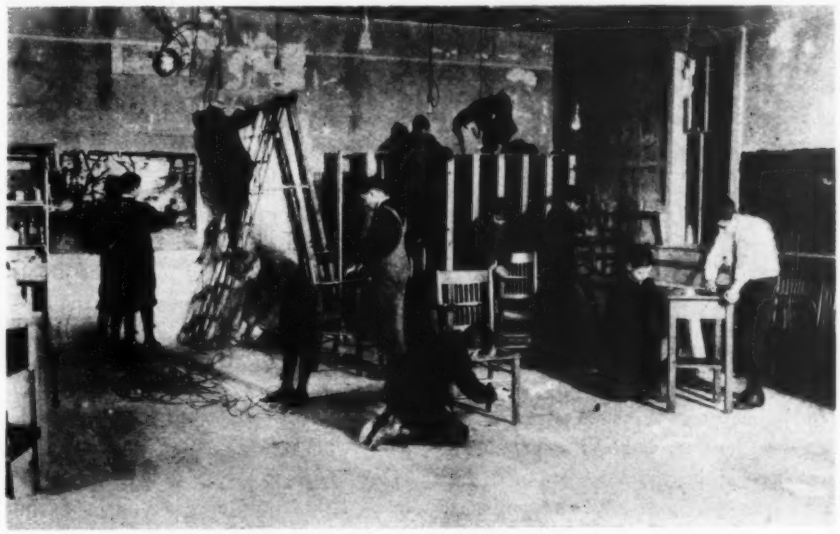
I dictated the address. She wrote it quickly. I dictated the sentences, one at a time. She took them on the machine. If time had permitted she would have looked over the letters for mis-spelled words and corrected them with the dictionary. There were several letters that morning and in such rush cases I corrected the mistakes.

As is often the case with some of these assistants, the letters are taken so well the first time that no corrections are necessary. They are ready to sign and send. In the letter to the previous visitor was one bad mistake. It might have been my fault in dictating, altho I doubt it. The title of my talk, as I dictated it to her, was "Bringing Real Life to School." She had written "Bringing Real Love to School."

When the letters were corrected and signed, my little clerical worker stamped them and mailed them on her way to a big dinner. "Such workers," so their mothers say, "always leave clean plates."

In our school days, foot pounds of strength, amounting to tons of physical power were used in climbing schoolhouse stairs. Volumes of mental energy and the priceless spur of spirit were exerted by the pupils, school people and parents that we might get our passing marks to promotion. So far as we knew, the benefits were not to be realized on the spending of these exertions until the sweet-bye-and-bye of the fugitive future.

Each school day closed with our wealth of expended power leaving in our consciousness a home, school, and community but little better off at the end of the day than they had been at the beginning of that day. Our



3. One-half of our men students are paid by neighboring towns for teaching Practical Arts every Friday to boys, who are younger than high school age. More evening school accommodations were needed in one of these towns. Their "Good man-Friday" was told of the need and was asked if he could meet it with his boys. Together they made ready for use an unused building. Cast off furniture was repaired and refinished. Clothes lockers were made and the room was wired for lights. Now it is used by day and evening school pupils.

4. A contractor in another town converted a church into a school building. The money appropriated for exterior and interior changes gave out and the school was opened without a suitable basement. Its floor was like that in a house built upon shifting sands. Every Friday, boys in charge of their Practical Arts teacher, were taught to mix the sand with stone and cement. A concrete floor was laid. Now the building boasts of a floor like that in a house built upon the smooth, substantial surface of a rock.

school was no better at night, in values we could appreciate, than it was in the morning, because we had worked in it all day. Our precious boy power had not been used in evident service.

In our schooling, service was confined to lip service —a word only to be spelled and pronounced. We overcame its troublesome letters. In this our teacher did a good job. Finally thru patient effort she drove it home that the next to the last letter in service was "C" instead of "S." When later we could emphasize the first syllable of four letters and glide easily over the "ice" of the last syllable, our teacher's interest in service suddenly grew cold and we were promoted to the next hardest word in the list.

We remember the writing chart crossed with sets of parallel lines, which hung on the wall during those lessons in writing. On next to the lowest line was this text: "It is More Blessed to Give than to Receive." We wrote it over and over until all the big and little letters toed the mark and the dots and crosses were in good standing. Just being a boss over the pen was all the quotation meant to us.

Schools kept us at the receiving end of the Master's most masterful line. Every school thing we had was given to us, not given by us. They gave us reading, writing and arithmetic. They gave us history, geography and dead languages. They gave us the socalled fads and frills of the day. We were made conscious of giving nothing in return. We were not schooled in the blessings of giving. We made absolutely no new contributions to the subject. Everything we did had been previously done and redone.

Each day they gave the same assignment of arithmetic to each pupil. One might have been absent from recitation. His answers would have never been missed. The teacher was the only one who needed a substitute. Even she made no new contribution to the subject, for the same old problems had been answered year after year by the preceding classes. Even before the books were bought the author had solved the problems once and for all time and put his answers in the back of the book.

In none of our studies did we know from experience what it was to give, to serve, to contribute. This big essential in a citizen's equipment was lacking in our schooling for citizenship.

School life is going to give part time to the introduction of such real life activities as will give boys and girls, long before they become of age, a chance to do the best act expected of a citizen—the doing of better than his bit, the giving of his best. During the habit making period of their teens, boys and girls are going to have personal experiences in Service. These experiences will fix in their consciousness a knowledge of the jogs and joys in the job of giving their share in the work of "world building" which should and must be delegated to them.

Hung across the street is a bannered appeal for citizens to subscribe during a Red Cross drive. The next to the last line reads in flaring letters "Give until it hurts." The author of that slogan characterized with more force than perhaps he knew the glaring failure of the schooling of his youth. We were schooled in the same class with him to strive for the results acquired from the use of in-going rather than out-going abilities. Consequently it has hurt to suddenly learn new habits of giving. In our first year at war we learned by heart more lessons in gift making and in Service than in all our previous years of schooling.

"If Christ had done nothing more for this world than establish the custom whereby the human family could manifest its warm feelings by making gifts at Christmas time, that in itself would have been an

achievement above all human glory. Open your minds to the reach of that statement," continues a leading Christmas editorial. "In war, in peace, in joy, in distress, the time of the birth of the world's Redeemer moves the minds and hearts of the men of the world with a power of giving beyond any other force which we know."

The eighth grade girl of the blue butterfly wrote by mistake "Bringing Real Love to School." By accident she expressed a need which we must strive to meet. Not only on one day in the year but daily we must bring real love, from which comes that warm feeling of Christmas giving, into our schools. We must teach the Master Teacher's lesson that it helps instead of hurts to give.

Open your minds to the reach achieved by daily bringing into the abilities and the hearts of those in school a lasting glow of the spirit of Him who was born under the first Star of Service, born that there might be given to the life of every home, school, and community, and to the world, a living example of giving in service, which bestows more blessedness than all else on Christian citizenship.

SHOP BUILDING FOR SMALL HIGH SCHOOL

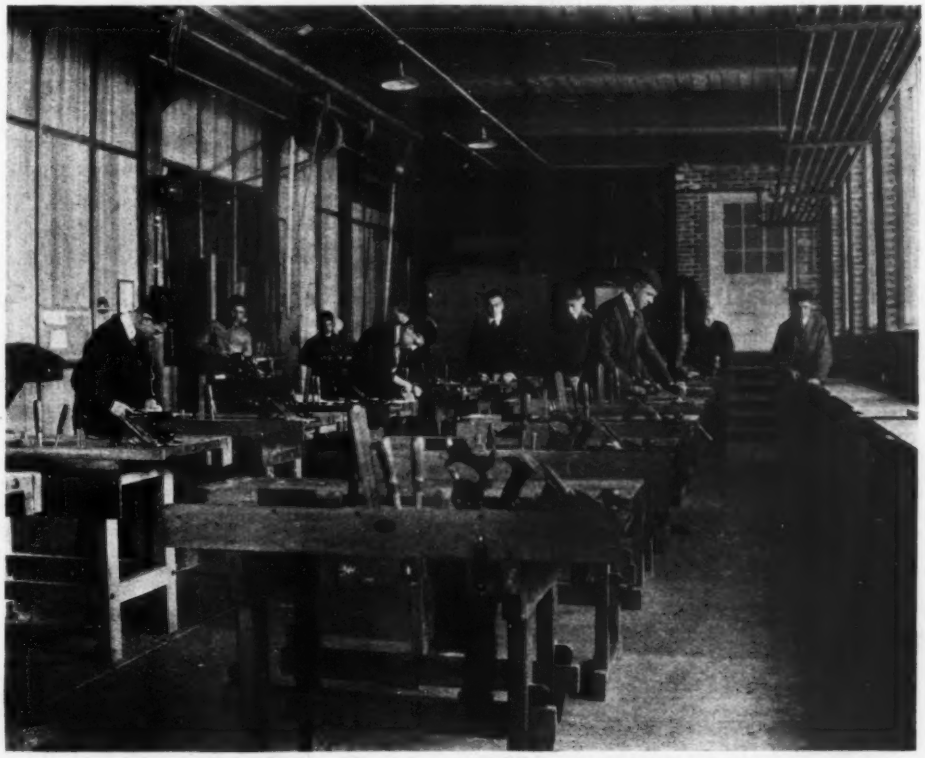
Roy Kimball, Milford, N. H.

WE completed last year, at Milford, N. H., a new Mechanic Arts Building which is proving so satisfactory for vocational work in a small high school that others may be interested in it, and find suggestions which may help to get their schools in line for Smith-Hughes aid.

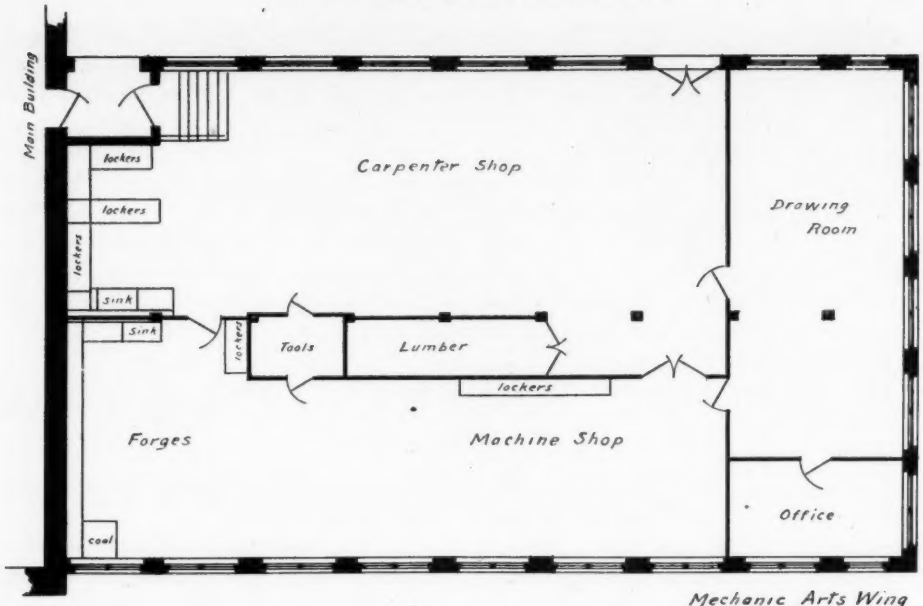
Milford has a small high school with only about 150 pupils in all but it is progressive, and two years ago it was decided to try a mechanic arts course. There had been manual training in the grades for two years, so the freshman work in woodworking was carried on in the old shop room in the basement for a year, and plans were made for a new building to be built in the summer. These plans were approved at the school meeting in the spring and the present building is the result.

It is a one-story brick addition of "mill" construction, eighty feet long and fifty feet wide, in the rear of the main building. The floor is about three feet below grade but as the walls are twelve feet high at the eaves inside, and this type of construction gives walls which are nearly all glass, there is excellent light even on dark days.

As will be seen by the plan there is a large woodworking room which accommodates the grade as well as the high school work, a drafting room at the end with light from the north and west, and a machine and forge room on the east. It is now planned to place a partition between the departments to keep



WOODWORKING SHOP IN THE MECHANIC ARTS DEPARTMENT OF THE MILFORD HIGH SCHOOL.



Mechanic Arts Wing
Milford High School

the smoke and dust from the forges away from the machines. There is also a good lumber room and tool room in the center of the building and an office in one corner for use of the instructors.

The outside shell of the building only was built by the contractors and cost about $8,000. The partitions were built by the boys in the woodworking classes, as were also the wall benches in the carpenter and metal shops. The partitions are of a single thickness of sheathing set as panels in a frame work of joists. This makes an economical and very satisfactory partition where it is not necessary to stop all noise. The boys also installed all the shafting and machinery and have done a great deal of fitting up, so that they feel that it is their building in a very particular sense.

The large double doors in the west wall constitute one of the handiest features in the building, as they allow us to receive lumber, machines and other bulky things with no trouble to ourselves or to the teamsters. They just back right up to the door and have a clear chance to unload.

The Milford High School is offering a vocational course, under the Smith-Hughes act, which includes carpentering, drafting, and wood turning in the freshman year, patternmaking and forging in the sophomore, machine work, electric wiring, and shop physics in the junior, and machine work and mechanics in the senior year. The senior course will be offered for the first time next year, as this is only the third year in which any mechanical work in the high school has been offered. The school is one of the first in the state to qualify for federal aid, and it was the excellent set of shops which made it possible to revise the course to conform to the requirements of the federal officials.

Costume Designing as an Essential to Normal Art Course

Evelyn D. Hansen, Wisconsin State Normal School, Eau Claire, Wis.

"Is red hair really 'red' or is it orange?
What is complementary color harmony?
Why do I look so large when I wear a plaid skirt?
What is intensity?
When I wear white shoes with a dark dress why do my feet look conspicuous and seem larger?
What is unity?
Why do I look cut in two pieces when I wear a white shirtwaist with a dark skirt?
What kind of colors should I wear?
What is analagous color?
What should I wear on different occasions so that I will be appropriately dressed?
All these questions and many others will be answered at an entertainment given at the Normal School on Friday evening, Feb. 7th, by students of the Normal Art Department."

This is the advertisement that appeared in our daily paper after the girls who are enrolled in the drawing course of the State Normal School had finished their course in costume designing. These girls go out to the various schools in the state as teachers in dress as well as in education.

They are examples to their community. Now, the question is: How many of these girls are going out as good examples and how many as poor ones? There is always a certain group of girls who must go to extremes in fashion as well as anything else, and we have them here as elsewhere.

In working out our program the girls worked in groups of two; one girl acting as a model and the other explaining the principles applied in the dress the model is wearing. In some cases girls from the model school

were selected and the normal girl, in place of being the model herself, was responsible for the dress of these younger children. By the use of a large color chart we explained the color harmonies, for we felt that the public must have color constantly kept before them during the program.

Correct and incorrect principles were demonstrated. For instance, in our examples of collars the two girls demonstrating were of two different types, the one slender and the other stout. The right and wrong collars were placed on both figures and the results made evident. In showing the proper selection of hair ribbons we selected all of our grayed-orange haired children and selected different colored ribbons to go with their hair.

The correct and incorrect dress for thin and stout persons attracted much attention. The young girl who dressed incorrectly for the stout person wore a conspicuous plaid skirt, a white shirtwaist with a polka dot tie tied incorrectly to give her width rather than length, and when she appeared on the program later attired in a navy-blue serge with long simple lines, very few recognized her.

We found that all of the girls taking part in this entertainment were keenly interested in its result and it seems only logical to believe that having once appeared in public dressed correctly or incorrectly that these principles will be impressed upon their minds.

During the rest of the school year the practice of tying ties, of dressing for unity, of securing color harmonies in dress will be constantly observed and to some great extent determine the final marks of the pupils.

This work is being taught thru the practice teachers to the grades of the Model School and they find it much easier to influence children than grown individuals. Would that we could all have had this training in our younger days, for there is nothing in the way of criticism that is harder to give and take gracefully than that pertaining to one's method of dressing.

The screens and hangings arranged on the stage were of grayed-green and brown. The only piece of furniture was an ivory dressing table and chair. The only spot of color was a large color wheel placed at the right of the stage. Nothing must detract from the appear- of the performers. Foot lights and a spot light were used. The rest of the auditorium was dark.

The program was about an hour and a half in length, including the preliminary talk and music. We are in hopes that thru means of this kind we can do more for cooperation of the townspeople and the school. We have already been asked to repeat this for the Woman's Club of this city at their open session.

The following program was given:

1. Music: Mabel Hatch.
2. Talk on Color: Miss Evelyn Hansen.
   Color Wheel: Intensity; Complementary Color Harmony (opposites); Analagous Color Harmony (Neighboring); Value. Scale.
3. Foot lights (color harmony of ribbons with grayed-orange hair).
   Models—Agnes Pierce, Lea Jarvis, Delores Chr'stopherson, Dorothy Christopherson, Ingebor Midelfart.
   Presented by—Marion Salter, Margaret Throne.
4. Hats.
   Model—Leona Crooks.
   Presented by—Anne McDonald.
5. The Smaller the Space, the Brighter the Color.
   Model—Lucille Monat.
   Presented by—Nannie Inglebretson.
6. Boys' Neckties.
   Models—Francis Culver, Wesley Ferguson.
   Presented by—Alice Fowler, Mabel Hatch.
7. Music—Solo: Lucille Horth.
8. Appropriate dress for High School Girls.
   Models—Dagny Midelfart, Louise Mason, Phyllis Bostwick.
   Presented by—Olga Moen.
9. Beads.
   Models—Mary Cook, Tess Hurley.
   Presented by—Ethel Mulvaney.
10. Collars.
    Model—Esther Ellingson.
    Presented by—Bernice Marsh.
11. Correct dress for thin figure.
    Models—Olga Brunstad, Cecil Rorvig.
    Correct dress for stout figure.
    Models—Olga Moen, Margaret Heiss.
    Presented by—Madeline Dougherty.
12. Music: Louise Culver.
13. Correct dress for children of primary grades.
    Models—Louise Culver.
    Presented by—Edna Bashford, Evelyn Murphy.
    Models—Evelyn Ingram, Winifred Woodford.
14. Skirt and Waist of Different Values.
    Model—Ila Kimpton.
    Presented by—Beatrice Leinenkubel.
15. Lack of Unity.
    Model—Florence Tormey.
    Presented by—Thelma Barton.
16. Correct dress for girls of grammar grades.
    Models—Gretchen van Schraeder, Ruth Bachman, Tryphene Nelson.
    Presented by—Esther Olson, Julia Andreson.
    Models—Marjorie Moon, Anna Mathieson.
    Presented by—Lucile Horth.
17. Sport Suit.
    Models—Bernice Nichols.
    Presented by—Gertrude Rounds.
18. Sweaters.
    Model—Sam Welch.
    Presented by—Mildred Dearth, Mary Casey.
    Model—Olive Evenson.

"THE effective teacher of art must be a large personality, a great soul, characterized by simplicity, sincerity, love of child life, faith in the eternal hopefulness of life, deeply conscious of human meanings and relationships, sympathetically responsive to nature and passionately devoted to an idealism that gives beauty its only justification when it is unified with goodness and truth."

—F. G. Bonser.

VOCATIONAL COURSES OF STUDY

III. Machine Drafting. IV. Foundry Work.

R. H. Rodgers, Director of School of Industrial Arts, Stout Institute

General Statement.

THE material of the outlined trade courses is presented with certain facts and suggestions in view:

1. Any one of the complete courses covers what a highly skilled and intelligent mechanic should know and be able to do in his trade.

2. The carrying out of such courses depends upon the school facilities which in many cases are limited; consequently it means only the operation and processes indicated under the machines in the local equipment. The completion of any of these courses should not be attempted in less than two years.

3. The tradework should be of such a productive character as not to lose sight of the end point, a skilled, intelligent mechanic.

4. The related technical and trade information should grow out of the immediate practical work and all irrelevant or "dragged in" material discarded.

5. The related vocational guidance information is suggestive for use during the prevocational period and parts of it may well be eliminated in a vocational course.

6. In connection with unit courses of instruction, especially machine shop, it will suggest processes and operations to be covered.

MACHINE DRAFTING.

It is not the purpose to outline a course covering the entire field of what might be termed mechanical drawing. One aspect only of the subject is covered which starts with the principles fundamental to all mechanical drawing and covers the material essential to the training of an efficient machine draftsman rather than a designer or engineer.

Trade Work.

1. Orthographic sketching.
   - Exercise, full and dotted lines on plain paper.
   - Two-view of a simple solid on co-ordinate paper, bringing in simplest elements of orthographic projection.
   - Lettering and dimensioning exercise.
   - *Note:* This exercise or similar ones should come in very frequently as the course progresses. The practice should be to make these exercises short and frequent rather than long and tiresome. Stress until a good technique is built up.
   - Miscellaneous two-view sketches of machine parts.
   - Three-view sketches.
   - Two or three-view sketches involving sections.
2. Mechanical Drawing.
   - Tacking paper on board and sharpening of pencils.
   - Use of T square, triangles, scale and pencil; various kinds of lines, general sheet layout.
   - Simple straight line working drawings with two views, full size, stressing the use of the above instruments; theory of projection and the proper location of views on the sheet.
   - Simple working drawings requiring three views, full size, involving use of compass.
   - Practical geometrical constructions, developments and intersections bringing in the use of the curve.
   - Working drawings to scale, including cross sectional views and simple conventions.
   - *Note:* Incorporate various conventions such as screw threads, bolts, nuts, machine screws and set screws into the working drawings from time to time rather than giving a sheet of abstractions without immediate application.
   - Working drawing problems.
     - Two views given to project a third.
     - Drawings from rough sketches and old castings.
   - Tracings of selected problems.
   - *Note:* Tracing should be well scattered thruout the course from the time the students begin to demonstrate some little technique with the pencil and instruments.
   - Blue printing, including use of the frame and electric machine.
   - Drawing of machine details.
   - Assembly drawings of parts previously detailed.
3. Elementary Machine Design.
   - Layouts of gear tooth systems for spur, bevel, worm and spiral gearing.
   - Various types of link motion covering quick returns and velocity diagrams.
   - Cam curves including uniform, harmonic and gravity motion as applied to the plate, face, drum and yoke cams.
   - Valves and valve motion as applied to various types of engines.
   - Design of simple machine involving a study of the stresses, strains, strength of materials, proportions of parts, factors of safety, usefulness and appearance.

Related Technical and Trade Information.

1. Mathematics.
   - Common fractions, decimals, simple equations, equivalents, percentage, ratio and proportion, mensuration and special practical short cuts.
   - Practical geometry and trigonometry as may be applied to solution of mechanical problems.
   - Use of logarithms and the slide rule.
   - Use of handbooks for problems involving conversion tables, squares, cubes, roots, logarithms, strength of materials and other formulae.
2. Industrial Science.
   - Elementary mechanics involving the laws of the lever, wheel and axle, inclined planes, screw and wedge with applications to various machines. Properties of various woods, metals, oils, fuels and other materials. Physical and chemical properties of air, wind pressure, compressed air. Melting and boiling points, generation of steam and combustion. Transmission of power by gears, pulleys, belts, shafting, rope and chain drives and friction.
   - Elementary metallurgy including the composition of cast, malleable and wrought iron, the various steels, copper, brass, bronze, zinc, lead, babbitt and aluminum.

Tests of materials for various machine parts including bearings, spindles, frames, wearing and cutting surfaces and parts under strains and vibrations, action of acids on metals, oxidation of metals and crystalization of steels under various conditions. Strength of joints; riveted, forced, sweated and brazed.

Heat treatment of various metals covering the expansion and contraction, case hardening, tempering and annealing.

Theory of making prints of various kinds.

3. Drawing.
   Study of the principles of perspective and isometric drawing, cabinet projection, patent office drawing and elementary structural drafting.
4. Elementary machine design.
   Study of the theory of gear tooth systems, various types of link motion, cam curves, valves and valve motion.
   Study of specific elements entering into the design of simple machines including stresses, strains, strength of materials, proportions of various parts, factors of safety, adaptability and appearance.
   Study of jigs and fixtures.
5. Materials of construction.
   Use and manufacture of cast, malleable and wrought iron, various steels, copper, brass, bronze, zinc, lead and babbitt.
   Standardization of general shop supplies including bars, rods, beams, fittings, bolts, nuts, screws, gears, pulleys, shafting, hangers and bearings.
   Cost of standard materials.
6. Shop systems and records.
   Time card systems, and drawing room methods of filing, recording and systematizing.
   Methods of listing specifications and requirements.
7. Drawing room equipment and materials.
   The problem of light, types of tables and their location, filing and printing equipment, kinds and quality of paper and cloth used for drawing purposes.
   Study of the various grades and makes of drawing instruments and personal equipment.
   Costs of standard equipment.
8. Supplementary sources of information.
   Texts, magazines, advertising materials, house organs and shop visits.

Safety First and Accident Prevention.

1. General shop dangers.
   Dangers of oily, dirty, and obstructed stairways and passages.
   Passing under crane loads, scaffolds, balconies and ladders.
   Open pits in the shop floor, elevator shafts and loose boards.
2. First aid.
   Care of and attention to all bruises and wounds.
   Note: The draftsman's work is such that he will not meet the above dangers, except as various jobs may call him to the different shops.

Related Vocational Guidance Information.

1. Function of the occupation.
   Relation of the specific occupation to the other trades in the particular industrial organization.
2. Importance of the occupation.
   Numerical place the occupation fills, locally and nationally.
   Value of product turned out, locally and nationally.
   Comparisons with other occupations, using graphic methods to illustrate.
3. Conditions of employment.
   Mental and physical strains involved in the daily routine of the work.
   Specialization and its effect on the worker.
   Dangers involved that must be taken account of; tools, machines, appliances, rigging and scaffolding.
   Welfare work for the improvement of conditions.
   Legislation pertaining to the safeguarding of the worker.
4. Hygiene of the occupation.
   Ventilation and its relation to the health of the worker.
   Fumes, dusts, acids and poisons and their effect on the worker's welfare.
5. Economic conditions.
   Hours and wages of the occupation.
   Average number of working days and income per year.
   Average period of earning ability.
   Comparisons with other occupations, using graphic illustrations.
   Profit sharing schemes, insurance and pension provisions.
   Legislation pertaining to hours and wages.
   Organized or unorganized as a trade.
   Evolution of labor and industry.
6. Entrance to the occupation.
   Age at which occupation is usually entered.
   Various ways of entering.
   Apprenticeship and conditions the learner encounters.
   Legislation pertaining to apprenticeship.
7. Demands for labor.
   Relation between supply and demand.
   Factors influencing the labor market.
   Ratio between the number of workers in the specific occupation and other related trades.
8. Qualifications for success in the occupation.
   Character of education, training and experience needed for success.
   Personality, attitudes and aptitudes requisite for success.
   Importance of good health, hearing, eyesight and mental and physical alertness.
9. Opportunities for advancement.
   Lines of promotion within the trade or industry and the rewards and responsibilities accompanying them.
   Trade and technical requirements needed for advancement.
   Personality, attitudes and aptitudes contributing to promotion.

FOUNDRY.

Trade Work.

1. Mixing and tempering of sand involving the proper use of shovels and riddles.
2. Setting up a mold for a simple solid casting using a one-piece pattern (bench work).
   Selection of flasks, bottom and follow boards.
   Placing of pattern on follow board and the proper ramming of drag.
   Rolling over flask and use of parting sand.
   Setting of sprue pin and ramming of cope.
   Venting and reasons for.
   Drawing of sprue pin and lifting off the cope.
   Swabbing around pattern and drawing.
   Patching if necessary and cutting of gates.
   Use of facings on the mold.
   Closing mold, clamping and weighting it preparatory to pouring.
   Note: The above steps are fundamental, and the proper use of tools, appliances and correct methods should be stressed until firmly fixed.

3. Setting up a mold from a simple split pattern or a pattern with a loose piece, in either case without cores.
4. Setting up a mold from a one or two piece pattern involving the use of core.
   Green sand core.
   Dry sand core.
5. Setting up of a mold from a one piece pattern or any simple pattern involving parting down or lifting.
6. Use of match board for small standard parts.
7. Mold from pattern with loose pieces to be drawn in.
8. Use of three part flask.
9. Open molds bedded in.
10. Molds from skeleton patterns involving use of sweeps and strikes.
11. Loam work, involving the bricking up, preparation of loam, use of sweeps.
12. Use of molding machine.
13. Brass, bronze and aluminum molding.
    Quality of sand used.
    Use of snap flasks.
    Preparation of mixtures and the use of crucibles.
    Skimming and pouring.
14. Preparation of molds for small steel castings.
15. Core making.
    Preparation of sand for cores.
    Cores from typical boxes.
    Use of core making machine.
    Use of core oven, baking and pasting.
    Note: Core making in part should be worked in as the course progresses.
16. Use of the cupola.
    Daubing of the cupola.
    Laying the breast and bottom.
    Charging.
    Preparing ladles.
    Tapping and drawing of metal.
    Dropping the bottom.
17. Pouring.
    Arranging molds on floor in groups.
    Handling of ladles.
    Pouring.
    Skimming and igniting the gases.

Related Technical and Trade Information.

1. Mathematics.
   Common fractions, decimals, simple equations, equivalents, percentage, ratio and proportion, mensuration, and practical geometry applied to foundry problems.
   Problems selected from the shop including the following: amount of metal required for a heat, weights of castings from the pattern, estimated cubical contents, proportions of coke and iron in charging cupola, practical geometry as used in floor and sweep work, estimating production and running expenses, hours and wages.
2. Industrial science.
   Elementary mechanics involving the laws of the lever, wheel and axle, inclined plane, screw and wedge with application to foundry problems.
   Transmission of power by gears, belts, shafting, friction, rope and chain.
   Elementary tests of different cross sectional areas to show strength of various cast metals.
   Effect of the blast and coke in the cupola and the presence of sulphur, phosphorus, silicon, manganese, carbon and various fluxes upon iron.
   Effect of silica, soda, potash, alumina, lime, iron, magnesia, organic matter and combined water in molding sands upon the metal.
   Chemical and physical properties of good molding and core sand. Facing materials and their action upon molding sand, action of molten metal upon the sand.
   Mixing irons to secure certain results such as gray iron, white iron, semi-steel, malleable iron and cast steel. Mixing metals to secure the various alloys such as brass, bronze, manganese, white metal, aluminum.
3. Drawing.
   Freehand sketching to enable molder to picture quickly special flasks, templates, plates, sweeps and fixtures as they may be needed.
   Principles of mechanical drawing to enable molder to read working drawings and determine where the finish is to come, thicknesses of metals, location of cores and in general be of assistance to the pattern maker in determining method of molding.
4. Materials of construction.
   Composition, use and preparation of the following foundry materials: molding and core sand, core binders, cast iron, both pig and scrap, scrap steel, coke, facing, flux and parting materials, fire clay and fire brick.
   Approximate cost of supplies.
5. Shop systems and records.
   Time card systems including the day wage and piecework systems.
   Standardization of flasks, plates, weights, clamps, cores.
6. Relation of foundry to pattern and machine shop.
   Value of cooperation between molder and patternmaker—cut down cost of production.
   Knowledge of machine shop practice which may determine the gating, the method of molding, the rapping and finishing of the mold.
7. Factors determining method of molding.
   Small duplicate patterns mounted and gated together and put up by machines or on the bench.
   Complicated molds making use of match plates.
   Large patterns made from skeleton patterns or made in loam molds with sweeps.
   Large fly wheels, or pulleys made in sections or with cores.
8. General tools and appliances.
   The cupola, its evolution, principles involved in its construction and operation, theory of charging for different metals, the function of the blast, judging proper condition of molten metal by its flow and color.
   The brass furnace and core oven, their construction and operation.
   The use of ladles, scales, air hoists, traveling carriers, crucibles, flasks, core plates, core and molding benches, power riddle, core and molding machines.
   General estimate of cost of equipment.
9. Hand tools.
   The use and care of hand riddles, trowels, slicks, lifters, mirrors, spray, swab, lifting and rapping pins and hooks, nails, jaggers, soldiers, rammers, hammer, sledge, bot stick, tapping bar, cold chisel, skimmers, shovels, stroke bars, coke fork, metal basket, sprinkling can and hose, wooden wedges, clamp bars, hack saw and brushes.
   General estimate of cost of hand tools.
10. Supplementary sources of information.
    Texts, magazines, advertising materials and shop visits.

Safety First and Accident Prevention.

1. Clothing.
   Proper shoes to wear for protection against molten metals, proper clothing for protection from cold and dampness, protection of eyes from glare of molten metal and flying sparks.
2. Use of foundry equipment.
   Cautions concerning hooking and fastening of crane loads, use of guards over gears and drums.

Care in handling heavy flasks to avoid injuries or strains.
Possible dangers encountered in charging and firing of cupola, taking off a heat, dropping the bottom, carrying and pouring of metal.

3. General shop dangers.
   Passing under loaded cranes, scaffolds, balconies or charging floors, open pits in the floor, flasks poorly stacked.
   Hot metals slopped on the floor.
   Explosions or blows due to improper venting or drying, cautions pertaining to weighting and clamping molds.
4. Inattention to work.
   Dangers of horse play, scuffling, carelessness and inattention while taking off a heat.
5. First aid.
   Care of and attention to all bruises, cuts and burns.
6. Legislation.
   Laws pertaining to the protection and welfare of the worker.

Related Vocational Guidance Information.

Same as for machine drafting.

THE TECHNICAL DEVELOPMENT OF THE LANGUAGE

Arnold Levitas, Instructor of Typography and Proofreading at the College of the City of New York and at Stuyvesant Trade School

THE English language has made wonderful strides of development since the days of Chaucer and of Shakespeare. It has become richer in eloquence, poetry, and prose. It has coined many new words, and has given birth to meanings of the most minute character. It has created the finest of shadings of interpretation to the spoken and written word, and has made it possible for the English-speaking people to transmit vastly more of their thoughts and ideas to their neighbors.

The Typography of the Language.

But with all this progress there has been a marked neglect in the study and mastery of the technical elements—the typography of the language; in other words, punctuation, capitalization, compounding, orthography, and consistency of style and spelling. So little attention has been paid to this important part of the interpretation of the written or printed page, that only a very small percentage of our intelligent community has a fair conception of its proper usage.

The great majority of successful writers, many of the most prominent editors, most printers, and even a great many proofreaders, possess no intelligent conception of these very important elements of the language.

The progress of civilization makes it necessary for the language to become more nearly perfect, to develop into a vehicle for the perfect transmission of thoughts and ideas, and to become gradually as effective on paper as it has become thru the human voice; for we are able by a change of voice or tone to give the minutest interpretations to our feeling, emotion, and exclamation, but we have not as yet reached that stage of perfection in writing or in print.

As our social and business duties become more numerous and complex, our language must become more flexible for expedient use in speech and writing. It is, however, much less difficult to shape the spoken language to our increasing needs than would be possible of accomplishment with the language in print. Efforts have not been wanting towards its perfection in the latter form; but its state of adaptability leaves a great deal of room for improvement.

The Printer Has Been Indifferent.

Since the first systematic attempts of Aldus Manutius, in the sixteenth century, to establish a method of punctuation, various efforts have been made to facilitate the reading of the printed page. These efforts—altho progressive and of some consequence—have not thoroly covered the needs, and that which has been done is understood by only a few. The great majority of the people possess only a meager knowledge of the various elements of language interpretation. Even the printer, who is constantly associated with it, and thru whose hands passes all the literature of the world, knows very little of his own commodity—the material which he is shaping. He seems to be more or less indifferent to anything but the mechanical part of his work and leaves the responsibility of proper punctuation and style to his customer.

When the Printer Was the Author.

The finest productions of literature of olden times were due largely to the printer, who was author, publisher, and printer at the same time. It was due mostly to his efforts that the typographical language has reached its present state of efficiency. With the division of labor of modern times, his efforts are limited and in some respects less effective. He is often handicapped by instructions to follow; but that is the result of lack of confidence in the printer's intelligence on the part of the author. If printers generally would take the interest in their work manifested by the masters of old, a great deal would be accomplished toward the progress of systematizing the language on the printed page.

No Common Interest Spirit Between Author and Printer.

There is no spirit of common interest between the author and printer today. The printer considers his work done when he has given the author his copy, and the author has become accustomed to expect no more. In most cases the author has no great conception of the intricacies of proper punctuation, consistency, orthography, etc., and feels perhaps content that he has given his readers the best interpretation of his message possible in print. The printer is not encouraged to look for better results, and in consequence becomes indifferent to anything but his mechanical duties.

Time Ripe for Higher Efficiency.

The time is ripe for a higher efficiency on the part of the printer. Not only should he develop the artistic display of type, but he must also improve the intrinsic value of the matter set up. While the writers are improving the language from the literary standpoint, the printer should improve the language from the typographical standpoint. Both printer and author should develop the mechanical element of it—that which deals with the proper interpretation of pause, inflection, and emphasis—because they are particularly fitted for this task thru their constant association with the language and with the building of words into sentences and paragraphs.

The Printer's Proofreader.

The time has come for the printer, and particularly for the printer's proofreader, to develop that element in his vocation which will prevent it from drifting into a mere mechanical process. He must develop the intellectual part of his work, and thereby save himself and the industry against the threatening danger of degeneration. It is the theoretical element of typography which has been neglected and which has gradually eliminated itself from the printer's program, and this element the printer must seek to retain and develop in order to progress.

Supplementary Education Needed.

The modern editorial room, publishing office, or printing office are so constituted that very little—if any—actual theoretical knowledge may be acquired there. It would be necessary to organize classes for supplementary education in order to remedy the growing defects and in order to provide for the higher status of the literary profession and the printing office of the future.

Practical courses in punctuation, capitalization, compounding, orthography, simplified spelling, grammatical rules, typographical and editorial construction of the book, magazine, catalog, etc., and modern schools of typography, and such other subjects as will be useful in the study of the technical elements of the language, besides the actual study of proofreading, preparation of copy, etc., would be appropriate and timely for the growing army of printers and editorial workers. Not only a smattering, but a comprehensive study of the most modern methods and ideas should be considered.

Plan Successful in New York.

That such a program is practical has been amply proven by the work accomplished within the past few years at the Stuyvesant Evening Trade School and at the City College, where the work has been tried on a comparatively small scale. It would be most advisable for the educational authorities and printers to get together on some feasible plan whereby more evening classes may be established patterned on the Proofreading and Typography classes now in existence.

The efforts put forth in that direction would be more than made up in the increased efficiency of the many men and women who are employed in the various branches of the publishing and printing fields and would show themselves in a higher and better product of the printed word. We might also expect that the greater intelligence and experience attained thru this movement would tend to stimulate the coming generations to more effective efforts in language improvement and that those would place the publishing industry on a higher plane of activity and increased prestige.

IF; FOR SUPERVISORS

Laura Rogers Way

(With apologies to Kipling)

If you can keep the lead when all about you
Are criticizing and blaming things on you;
If you can trust your plans when all around you
Are finding fault and kicking too,
If you can teach and not be tired of teaching,
And show the others how it should be done,
And give directions without preaching,
And yet not seem too smart or just in fun.

If you can paint and not make art your master,
If you can weave and carve and plane,
If you can sew and paint and plaster,
And treat these subjects just the same,
If you can bear to see the things you've started,
Bungled by children till you'd hardly know it,
If you can show mistakes and seem good-hearted,
And rush six hours a day and never show it.

If you can succeed with all of your beginnings
And yet not push your work nor ask too much,
If you can create boxes, bags and all their trimmings,
Books, cards, posters and all such,
If you can do all these things in the twinkling of two eyes,
And from the Holy Three R's you take not a minute,
You'll then be ready to supervise,
I almost advise you, never to begin it.

If you can plan and mount and hang an exhibition,
And to each grade and room do justice,
If you can choose the best from all the great collection
That's sent in bundles and bales to your office,
And make all your rounds at the regular pace,
And work out new plans and get out supplies
Tho your tongue hangs out like a dog's in a race,
If you can survive,—then supervise.

If you have patience and kindness and charm,
If you can be stern and heartless and cold,
If you can make fun without doing harm,
If you can stay youthful and never grow old,
If you can spend your money and save it too,
And make ends meet when expenses rise,
If you can keep your sweetness as angels do,
'Tis a wonderful work—to supervise.

If you can make boys and girls your friends,
And teach the beauty of the world you see,
If you can show the glory that the sunset lends
To mountain, plain, and budding tree,
If you can preach the gospel of beauty,
To souls that would see not, otherwise,
Then up and begin! 'Tis surely your duty
The message to carry, go supervise.

A COURSE IN METAL WORK FOR HIGH SCHOOLS

Edward Berg, Washington High School, Milwaukee

IN the selection of subjects for the industrial arts course in a school it is contended that the subjects offered should embrace the important industrial activities of the community in which the school is located. This is based on the experience that the majority of students when leaving school, enter upon some gainful occupation in the industries of that community and will better be able to rise or advance and become successful in their occupations because of the training received while in school. However, the industries in many of our high school communities are varied and the activities in these industries are numerous. It would seem wrong, therefore, to offer training in only one occupation. On the other hand, because of financial and other reasons it is impossible in most schools to offer a specific training in many of these industrial activities. Also, it is difficult and practically impossible to determine in advance, which one of a group of activities or occupations an individual may engage in upon leaving school, so that the person may receive training in that specific activity. It would seem proper hence that we should offer such subjects as will embody elements of training in a group of industrial occupations and that the ultimate aim of our courses should be industrial education rather than industrial training; education for industrial work rather than training for a specific industrial activity.

It is on these grounds only, it appears, that woodworking as it is taught, has justified its existence as a subject in the course of industrial education in many of our schools. Thru the construction of a furniture project a student is carried thru the process of expressing an idea conveyed in a working drawing; he learns to appreciate the value of accuracy in measurements, in making duplicate parts and in making parts that must fit together; he is taught to follow instructions and methods of procedure and he acquires a certain amount of skill in the manipulation of hand tools, all of which mean for an industrial efficiency.

I feel, however, that woodworking as a subject in a course of industrial education does not justify its popularity and the importance given to it. In many of our schools it is taught to the exclusion of all other industrial-art subjects and in most schools it is given the place of greatest importance. In many courses, instruction in woodworking occupies the first year or even two years, and the majority of students receive no other training. This is true of some communities where industries and occupations other than woodworking are of greatest importance.

The greatest and the most important industry in the United States today is the metal and metal working industry. The greatest and most important industry in the world today is the metal industry of the United States. The enormous wealth of natural resources of coal and iron and other metals are the foundation for making the United States the largest metal products manufacturing country in the world. The mines of the Lake Superior region alone, in a single year, contributed enough iron ore to make possible a wall around the United States a yard thick and eight feet high. Our railroads, our factories, our steamship lines, all things that make the United States potentially the strongest nation on earth owe their existence and possibilities to these abundant resources.

To form a picture of the vastness of the steel and iron industry alone, even back in the slack and uncertain days of the year 1914 it is said one must think of a row of blast furnaces reaching from New York City to Pittsburgh, Pa.; of a column of rolling mills and puddling furnaces reaching from New York to Indianapolis; of a stream of ten tons of liquid iron flowing out as molten pig metal every second of the year. This enormous output of the raw material is fed into the great metal working industries thruout the United States where products ranging from tiny watch springs that weigh only a fraction of an ounce to large fly-wheels that weigh several tons are made. It is metal every where and always, metal for engines, motors, and electrical apparatus; metal for automobiles; locomotives and bicycles; metal for ships, rails and cars; metal for boilers, stoves and steam appliances; metal for bolts, nuts and hardware; metal for plows, binders and threshers; metal for bridges and buildings; metal for paper machines and printing presses; metal for cutlery and jewelry; metal for weaving machines and knitting needles; metal for telephones, pipes, wire, watches, pens, furniture and thousands of other things. The manufacture of almost every article we need whether made of metal or not is accomplished with machinery and tools made of metal.

There is consequently a multitude of occupations in which training in some of the fundamentals of metal working is of a decided vocational value. Our students when they leave school may become machinists or jewelers, draftsmen or designers, blacksmiths or tinsmiths, machine hands or auto-repairmen, electrical workers or structural steel workers, wire workers or sheet metal workers, hardware clerks or machinery salesmen, locksmiths or gunsmiths, engineers or plumbers. They may be artisans or clerical administrative workers. To all, from the mechanic at the bench or machine to the general manager of the plant, from the driver of the motor truck to the salesman of the product, a knowledge of metal working is necessary or of great value. There is hardly an industry or occupation in which metal does not play an important part, and when we think of agri-

culture, manufacture and transportation, we must think of metal and mostly iron and steel.

In view of the fact that the metal working industry is such an important one and that we find forms of it in every community; in view of the fact that training in some of the fundamentals of metal working is of vocational value in many vocations and activities, it seems to me that a course in metal work should be offered in every high school. It should be given early; at least in the second year and should be encouraged as an elective subject in courses other than the manual arts such as the science course and the commercial course.

In considering the introduction of a course of instruction the equipment available is an important factor. An equipment for teaching machine-shop practice is costly and out of the question in most cases. An elaborate equipment to teach tinsmith work is wrong as such a course is not broad enough in its aim or value. It seems to me that a course with a small equipment, in which some of the elements and fundamentals of a variety of metal work were taught, would be very valuable. Not a course in machine shop practice or forging or tinsmithing, but rather a course which will include working with different kinds and forms of metal and include some of the elements of many practices. Since the aim and value of a course is determined largely by its contents and since the projects determine the equipment necessary, the accompanying drawings with explanations are presented as suggestive of a socalled Bench Metal Course. As to the equipment necessary, the problems will suggest what is needed. It may be said, however, that it should include individual vises and bench tools such as files, a scale, snips, a small square, a hammer, a chisel, a center punch and dividers, and should include among the general tools one small drill press, one gas forge or furnace and anvil, and two or three small furnaces for heating soldering irons. A gas forge, or furnace, is mentioned as it has a wider range of usefulness than a coal forge and can be more easily installed in that it does not require connection with a chimney to carry off smoke. The aim is to keep the equipment small rather than large. This is to develop thinking power, mechanical judgment, resourcefulness, and adaptability in the students.

The problems are not arranged in any definite order and are merely suggestive of the ground that is to be covered. The processes involved and relative information that may be taken up for study in connection with the problems are given in each case.

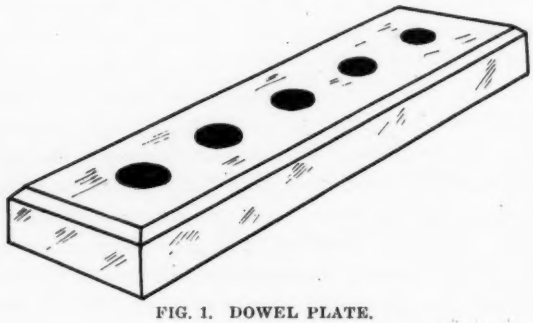


FIG. 1. DOWEL PLATE.

1. The *Dowel Plate* is made of cold rolled steel. It is a problem in sawing from a bar, filing square and to length, and accurate drilling to circles. *Relative information:* Elementary study of metallurgy of iron and steel.

2. The *Shoe Scraper* is made of structural iron forms and involves sawing and filing to length; laying out holes; drilling holes; forming rivet heads. *Relative information:* Rivets and riveting; standard forms of structural iron and steel.

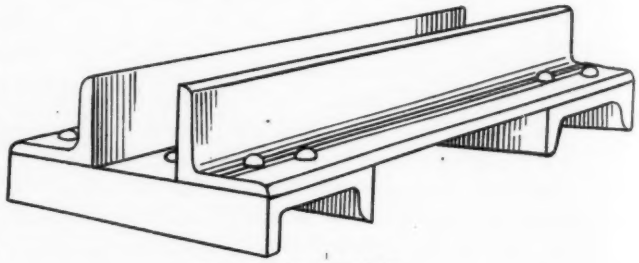


FIG. 2. SHOE SCRAPER.

3. The *Garden Trowel* is made of heavy sheet metal and round wrought iron. It includes cold chiseling; filing and shaping; bending; drilling; riveting. *Relative information:* Manufacture of sheet iron and sheet steel; drawn and cold pressed metal work; forming tools and dies; spinning.

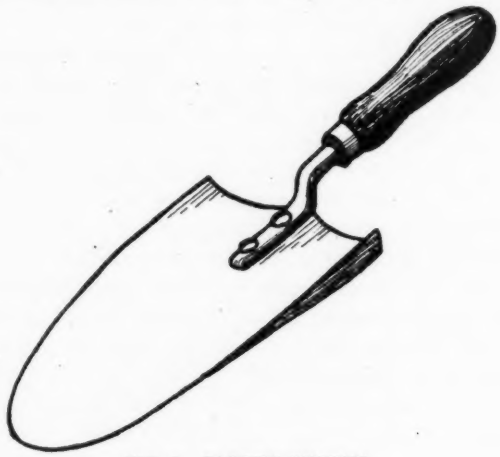


FIG. 3. GARDEN TROWEL.

4. The *Steel Square* is cut from heavy sheet steel and filed to shape and size. It affords practice in laying out, chiseling and accurate filing on a narrow surface. *Relative information:* Metal working measurement tools and precision instruments.

5. The *Saw Filing* exercises are accomplished on short pieces of saw steel and are used to teach jointing, filing and setting of saw teeth. The pieces can be used many times and the practice gained may be used in filing

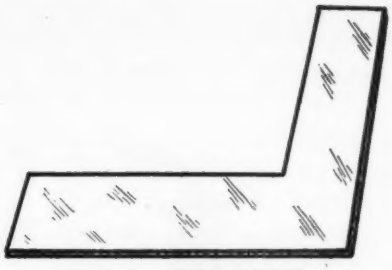


FIG. 4. STEEL SQUARE.

hand saws. *Relative information:* Saws; their manufacture, use and care; circular saws; metal cutting saws.

6. The *Keys* are filed from standard blanks. The problem may include the making of a duplicate key and

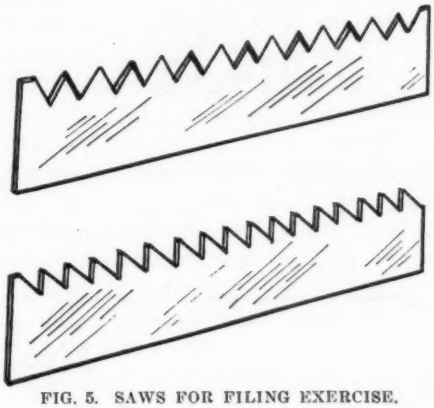


FIG. 5. SAWS FOR FILING EXERCISE.

also filing a key to fit a simple lock. *Relative information:* Kinds of files, their use and care.

7. The *Megaphone* is a problem in light sheet-metal work. It is made of tin plate and involves pattern

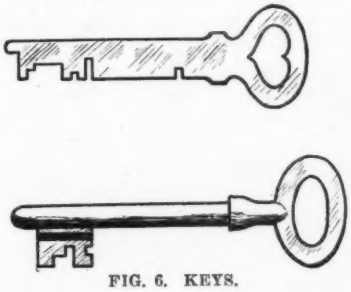


FIG. 6. KEYS.

developing; cutting with snips; crimping; shaping; soldering. *Relative information:* Manufacture of tin plate and articles made of tin plate. Solders and fluxes.

8. The *Coat Hanger* folds up flat and is designed for use in traveling. The frame is made of wire; the bands which support the garment are of cloth. It is a problem in cutting, bending, twisting and shaping wire. *Relative information:* Manufacture of wire; wire gauges; varied use of wire; wire products such as nails, etc.

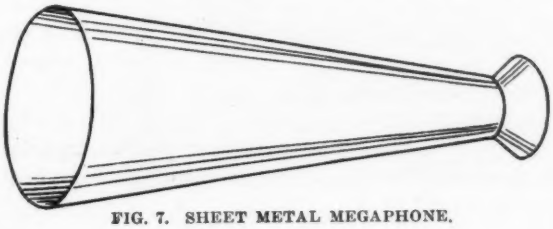


FIG. 7. SHEET METAL MEGAPHONE.

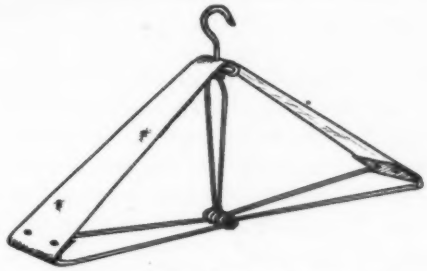


FIG. 8. METAL COAT HANGER.

9. The *Threaded Rod and Nuts* are to afford practice in cutting threads with die and tap. The nuts are sawed from square and hexagonal cold rolled steel bar stock, filed to proper thickness, drilled and tapped. The face of nuts should be square with the thread when finished. *Relative information:* Standard forms of threads; thread cutting; dies and taps; bolts and screws; cap screws; set screws, etc.

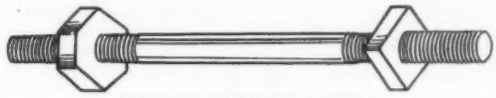


FIG. 9. THREADED ROD.

10. The *Gas Pipe Nipple* is intended to give practice in cutting a length of gas pipe with a pipe cutter and threading the ends. It is also the aim in connection with this problem to provide practice in making connections with gas pipe. This can be accomplished by fixing two nipples on a wooden frame, the problem being to pipe from one nipple to the other. With the use of a large box of short pieces of pipe, nipples, elbows, unions, couplings, stop cocks, etc., a variety of problems can be

FIG. 10. GAS PIPE.

given and solved without the cutting of pipe. Problems in measuring the exact amount of pipe and fittings necessary to make connections between two points may also be given. *Relative information:* Pipes and pipe connections, flanged and screwed joints; valves; tubing.

11. The *Chisel* is made of tool steel and affords practice in the forging, hardening and tempering of a metal cutting tool. The *Screw Driver* is a similar project. *Relative information:* Hardening and tempering; high carbon steels; steel alloys; cutting tools.

12. The *Hammer* is made of cold rolled steel. It involves careful laying-out, drilling, filing, etc. When filed to shape it is case hardened, tempered, and polished.

FIG. 11. CHISEL.

FIG. 11a. SCREW DRIVER.

A neat and suitable steel wedge should be made for use in securing the handle. *Relative information:* Case hardening, heat treatment, and coloring of steel.

13. The *Skate Key* is made of cold rolled steel and case hardened. The hole for the cross pin or handle

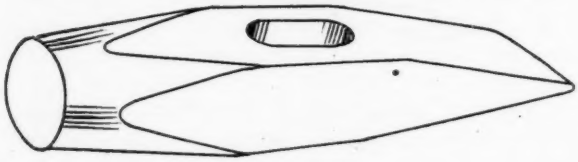


FIG. 12. HAMMER.

should be drilled with the proper drill to make a drive fit with a piece of standard size cold rolled stock. The square hole is made by first drilling with proper size drill and then punching with square punch either cold or hot. *Relative information:* Running fits, drive fits, press fits, shrink fits, etc., broaching.

FIG. 13. SKATE KEY.

14. The head of the *Carpenter's Scratch Gauge* is cast of iron, filed true on the marking face and then drilled and reamed for the bar or rod which is of cold rolled round stock. *Relative information:* Reamers,

FIG. 14. SCRATCH GAUGE.

their use and care; expansion reamers, taper reamers, etc.

15. The *Watch Fob* is a problem in sheet copper and brass. It involves saw piercing, hard soldering and planishing. A small copper bowl may be made to afford some experience in shaping copper by hammering. *Relative information:* Copper ores; copper mining; copper alloys.

16. The *Hack Saw Frame* and the *Paper Punch* are constructive problems involving many processes including filing, drilling, thread cutting, bending, riveting, etc. In connection with these a study of the drill press or other machines in the shop, with reference to

FIG. 15. FOB.

the kinds of metal the different parts are made of, may be made.

Other things that may be studied in connection with a course of this kind are the transmission of power;

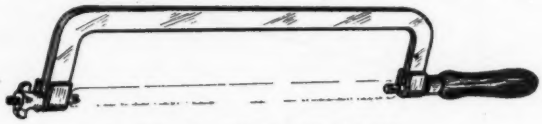


FIG. 16. HACK SAW FRAME.

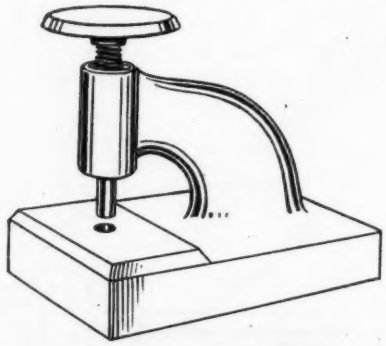


FIG. 17. PAPER PUNCH.

belting; gears; fastenings such as keys, set screws and taper pins; abrasive wheels, bearings, lubricants, etc. It would be a good thing to afford practice in the pouring and scraping of a babbitt bearing; in fact, very little time should be spent on abstract study as things should be taught thru doing them. A student really does not know the characteristics of different metals until he has drilled, filed, sawed, chiseled, bent, hammered, shaped and worked with them.

New equipment may be added from time to time but care should be taken to adhere to the idea that the course is to be comprehensive, fundamental and above all educational.

THE EVOLUTION OF A FLOAT

Dorothy Crosby, Art Instructor, Central High School,
Grand Rapids, Mich.

IN the Memorial Day Parades that will move thru our cities this year, the schools will be asked to lend a helping hand, and it is for us to embody our ideals of patriotism and tribute to those whose sacrifice has made them immortal in a dignified and fitting way, and also, perhaps, to unleash our imagination from the inertia that seemingly grips it when such a call comes. We have learned much in the past year about patriotic pageantry. Working upon these traditions, we shall plan for this parade, the "grand finale" of patriotic parades that have been inspired by the great war, the most beautiful and adequate expression of them all. Certain mistakes, the outpourings of patriots of perhaps more zeal than good taste, will not be repeated.

A successful parade will have a general scheme or plan, all organizations taking part—religious, social, education, commercial—each being given a definite place and working toward a unified whole, the executive head keeping in touch with all. Ideas may be taken from historical sources, great world movements that parallel this last crisis—the triumph of *right* over *might,* immortality of fallen heroes, growth of democracy—these presented in pantomime or tableau form thru the time-honored parade mediums, the float, marching groups, pennants, banners, symbolic and allegorical figures, any one of these a very interesting problem to handle, in which one may feel assured of plenty of enthusiasm.

Last year in one such parade, a high school art club was assigned to present a float illustrating life in Revolutionary times in a section representing periods in the history of the United States. All interests in the club joined hands in the design and construction of the float. Each member found something that he could do. Those possessed of originality in expressing themselves and some knowledge of composition, acquired partly thru study of the Little Theater that had been taken up in the club meetings, coaxed into sketch form latent ideas. The sketches showed Betsy Ross, colonial dames, liveried colored servants, and children in picturesque colonial costume and it was decided to use them all, grouping and unifying them by means of an arched background with a center panel of old-gold paper against which the figures, standing or seated on the steps attached to either side of the framework, would be shown in relief. The dray, borrowed from a wholesale grocer, had next to be carefully measured and drawn to scale in plan and elevation with the framework of the background and steps. These drawings were sent to the manual training department and the construction was taken care of in the shops.

In the practical working out of the scheme, harmony of textiles and color was carefully considered. After some old mounts had been tacked to the framework as a backing, it and the floor were entirely covered with pure white paper of a semi-gloss finish. An apron of the same material hung from the floor to cloak the skeleton of the dray. The color scheme was restricted to red, white, blue, old gold or khaki, and black.

The costume sketches were drawn by members of the club interested in costume design, liberal use being

ONE SIDE OF FLOAT FOR MEMORIAL DAY PARADE MADE BY THE AUTHOR S STUDENTS.

made of reference books. All who were to appear on the float were given definite ideas of their costumes, to be followed as closely as might be. To guarantee harmony in textiles and color used, samples of sateen in the above colors were sent out with sketches of each costume that was to be made for the occasion.

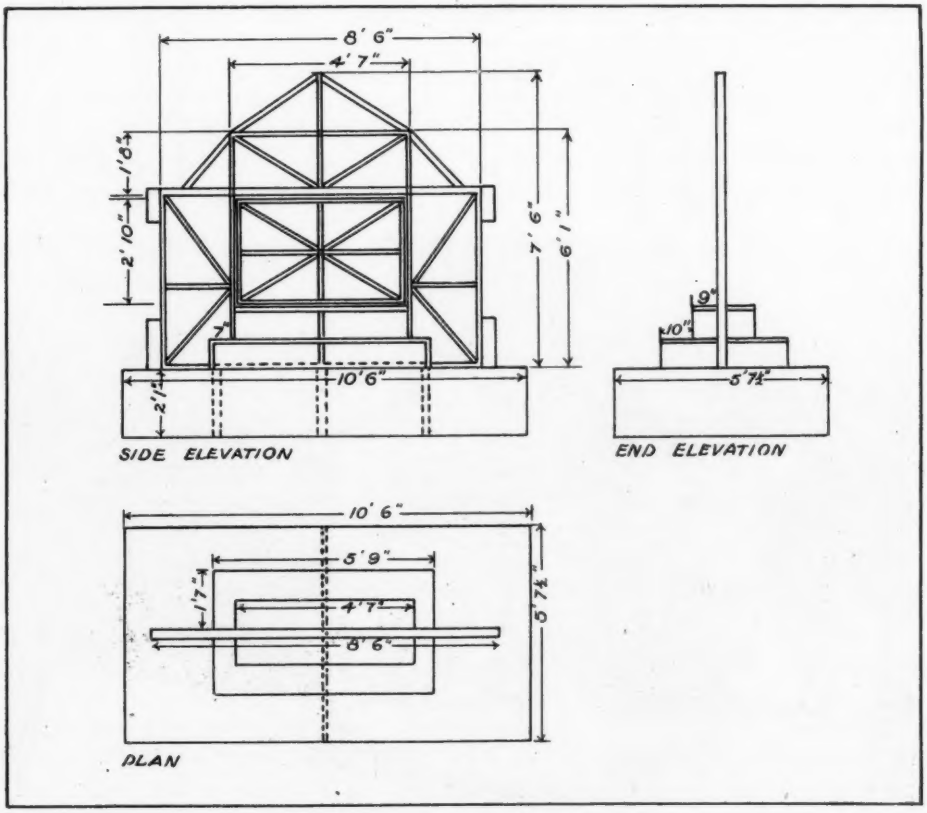
The two sides of the float were similar in arrangement. On one side characteristic colonial types were grouped about a colonial lady and gentleman with powdered wig and soft satins and laces. On the other were Betsy Ross with the flag and colonial girls in bright, full skirts, fichus, and caps "doing their bit" with knitting needles. At the left and right on either side stood a small boy and girl each holding a tray piled high with knitted goods and yarn—loaned from Red Cross headquarters—and a spinning wheel stood suggestively near.

Added features consisted of explanatory letters in old blue just above the gold panel and in the center of the arch a plaque of a silhouette of Washington in white against the same "old blue" ground—Wedgewood inspiration. A string of red, white and blue paper flowers framed the plaque and were festooned back to red, white and blue rosettes right and left. These strings were repeated on the apron drop, then a wreath and festoons for each dappled gray horse and the float was on its way.

Many unusual compositions may be thought out and put into form by the use of familiar materials and methods such as those explained and, added to these, the use of banners, pennants, stenciled decorations, posters, and canopies.

ONE SIDE OF THE FLOAT.

Bedside occupations are being taught for the first time to patients in the U. S. Naval Hospital at New London, Conn. Basketry, knotting and beadwork are offered to bed patients, and toymaking to convalescents. The work is under the direction of the American Red Cross and is in charge of a Red Cross instructor, assisted by volunteer aides. Articles made are sold at a moderate price, to cover the cost of materials and a fair amount for labor, and the proceeds go to the patients.



DETAILS OF FRAMEWORK FOR FLOAT.

SPANISH FURNITURE

Leslie G. Martin, West Henrietta, N. Y.

(See plates on pages 234 and 235)

SPANISH furniture of the 17th and 18th Century is worthy of serious consideration by the student of design or cabinet making. It is a source of inspiration and many designs and decorative effects may be adapted or reproduced with success. It has a very distinctive charm.

The decoration of Spanish furniture is dignified and restrained, with strong appearing contours, and an intensive enrichment. It is generally vigorous yet restrained.

Walnut was used almost exclusively until the middle of the 18th Century when mahogany began to be used. They used both inlay and painting as well as carving in the decoration of their furniture. The carved ball-and-claw foot, scroll foot, mounded plinth, arcaded panels, pilasters, rounded arches and rosettes were used. Square tapered legs were used as well as turned legs and spindles, showing well balanced proportions. Spiral turned pillars, triple rows of gouge carving, scrolls, crestings, heraldic design and shell carvings are also Spanish features and much used.

Local conditions determined many of the characteristics of Spanish furniture and in different parts of Spain many different effects are noted. Some of the decorations used were inspired by the Moorish tradition of working in small squares.

The Spanish people had a great interest in fine iron work, which is shown by the carefully wrought nail heads, clasps, perforated key plates, iron braces underneath tables, and other ornaments. The metal hinges, and key plates were often gilded, chased or perforated in rich designs. The draw pulls were of both wood and iron.

The study and construction of a piece of Spanish furniture offers a fine opportunity for cooperation between classes of design, metal-work forging and cabinet making.

The Spanish chests were usually heavy, with projecting scroll feet. Some were covered with leather which was tooled, stamped, gilded or fastened on with brass or wrought nails. Others were nearly covered with inlay of bone or ivory. Some of the finer chests had perforated silver ornaments on a velvet background. The cabinets were often placed upon a table with trestle legs which were braced with wrought iron. The cabinets opened and closed and were decorated much more elaborately on the inside than they were on the outside. Some were decorated on all four sides so they could be placed in the center of the room.

The table was also an important piece of furniture. There were several varieties, some were long with graceful carving and trestle legs braced with iron braces. Sometimes the legs were plain and sometimes richly ornamented. Other tables were short with a thick plank top and paneled sides with a draw. The construction of the tables was good, the underframing being dovetailed.

The benches used were of strong construction and had very little ornament except on the backs. Sometimes the back was solid and again it was a rail supported by posts or the back was arched similar to the chairs. They had no arms and were braced with iron braces in a manner similar to the tables.

Stools were used quite extensively and were of many types. Some were low and nearly square and others were longer and were used with the long tables.

There are several types of Spanish chairs. Some were of the folding type similar to the Italian chairs, but these were not as comfortable as the straight chairs with runner feet supporting pairs of legs. The stretcher between the front legs was often richly ornamented and the chairs were upholstered in velvet, brocade or leather. The chairs designed for the monks and for use in churches and monasteries were very rich in design. The cabriole leg and cresting on chair backs was used some in the 18th Century.

In the 18th Century outside influences had some effect on Spanish furniture but the characteristic Spanish features were always present. Some of the furniture had features resembling those of Queen Anne, Sheraton and Chinese furniture, but still it was distinctly Spanish.

VOCATIONAL WORK AT RED BLUFF, CAL.

The Red Bluff Union High School at Red Bluff, Cal., has continued its work along vocational lines under the supervision of Mr. E. E. Biddall, head of the Manual Training Department.

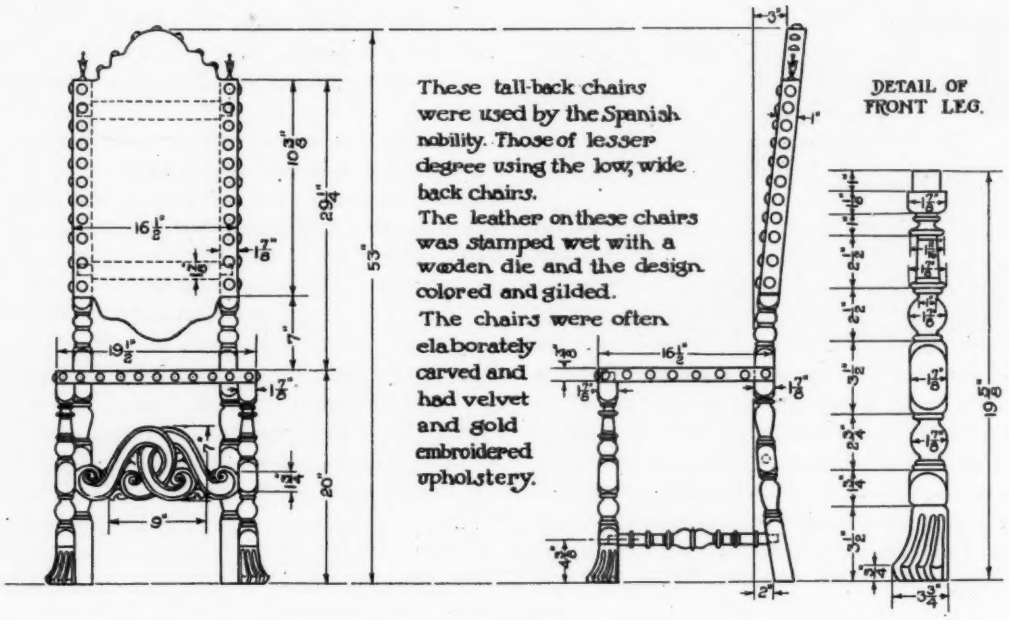
In 1917 the boys of the department constructed a gymnasium building at a cost of $7,000 and in 1918 a manual training building at a cost of $10,000. During the present year the work has been of a different character providing for the construction of three tennis courts. This was no light task as levels were required and all surplus earth had to be removed. To make the work more complex, a fall of six inches to one side in 118 feet and fourteen inches to the other in 150 feet were allowed for drainage purposes.

The cement base is four inches thick and altho the job is only partially completed, 450 sacks of Portland cement have been used. The cement and gravel were mixed in a mixer in the proportions of five to one. After the cement is all down, a layer of asphaltum one-half inch thick is spread and sanded. The courts are fenced with a good grade of galvanized chicken wire on iron pipe posts.

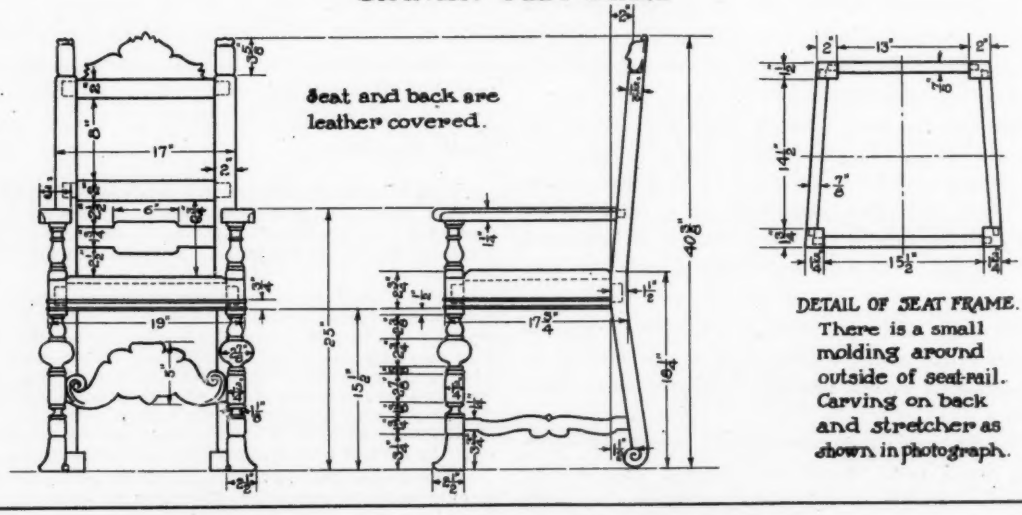
While doing this outdoor work, the shopwork was not slighted. A total of 96 bedside tables for the Junior Red Cross were completed, as also drawing desks, work benches and a stairway.

In the machine shop which is located in the new addition, the work has progressed in fine shape with Mr. J. J. Hammer as instructor. The boys have repaired twelve automobiles. All the work has been practical, with attention given to repairs and replacements and to adjustments necessary to the proper operation of the automobile. The aim of the automobile work has not been to compete with garage work but to give the students an idea of the construction of the gas engine and its uses, as well as to serve them in handling tractors and in selecting a life occupation.

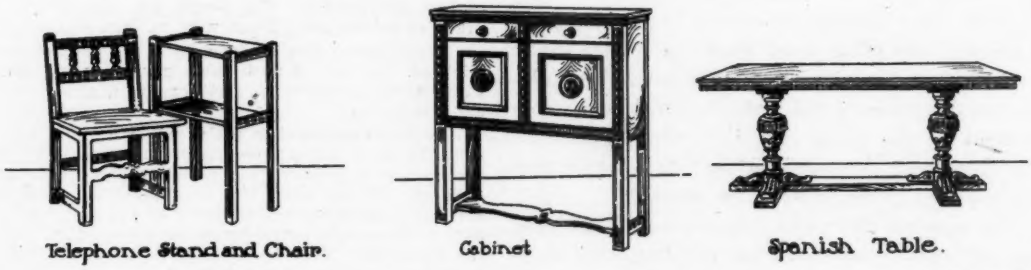
SPANISH CHAIR


These tall-back chairs were used by the Spanish nobility. Those of lesser degree using the low, wide back chairs.
The leather on these chairs was stamped wet with a wooden die and the design colored and gilded.
The chairs were often elaborately carved and had velvet and gold embroidered upholstery.
DETAIL OF FRONT LEG.

SPANISH ARM CHAIR

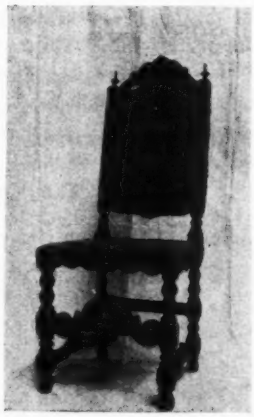

Seat and back are leather covered.
DETAIL OF SEAT FRAME.
There is a small molding around outside of seat-rail. Carving on back and stretcher as shown in photograph.

Sketches showing furniture adapted from Spanish styles.

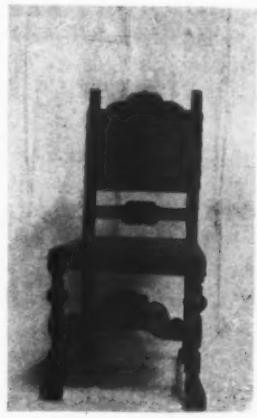


Telephone Stand and Chair. Cabinet Spanish Table.

Leslie G. Martin.



SPANISH ARM CHAIR CONSTRUCTED OF WALNUT 17TH CENTURY FINE CARVING ON FRONT RAIL AND BACK. THE SIDE RAILS HAVE A SIMPLE LINE CARVING. THE BACK LEGS HAVE A CYLINDRICAL FOOT WITH A GROTESQUE CARVED HEAD AT TOP. THE FRONT LEGS ARE TURNED WITH CARVED SPANISH FOOT. SMALL MOLDING AROUND SEAT RAIL. THE SEAT AND BACK ARE COVERED WITH TOOLED AND STAMPED LEATHER THE LEATHER IS DARK BROWN WITH DESIGN COLORED IN GRAY, GREEN AND RED THE LEATHER IS FASTENED WITH LARGE BRASS NAILS.

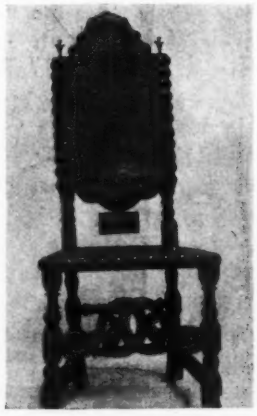


SPANISH WALNUT CHAIR OF THE 17TH CENTURY. THE SEAT AND BACK ARE COVERED WITH TOOLED LEATHER HELD IN PLACE WITH LARGE BRASS NAILS WITH MODELED HEADS. LEATHER IS COLORED DARK RED GREEN AND GRAY.

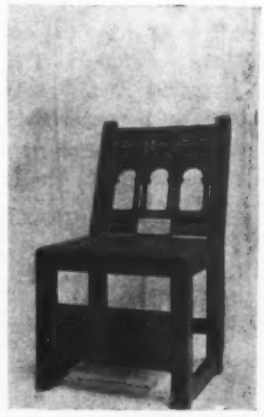
SPANISH WALNUT CHAIR OF THE 18TH CENTURY CARVED FRONT RAIL WITH TURNED LEGS AND SIDE RAILS. THE SEAT AND BACK ARE COVERED WITH TOOLED AND MODELED LEATHER IN AN ELABORATE DESIGN. BRASS FINALES ON BACK.

SPANISH WALNUT CHAIR OF THE 17TH CENTURY FINE CARVED FRONT RAIL. LEGS ARE OF THE BULBOUS TYPE WITH CHARACTERISTIC SPANISH FOOT. SEAT RAIL HAS SMALL MOLDING AROUND EDGE. STAMPED LEATHER BACK AND SEAT.

SPANISH CARVED OAK CHAIR. STRONG CONSTRUCTION. THROUGH MORTISE AND TENON JOINTS. SIMPLE CARVING-ARCHED BACK. FURNITURE PHOTOGRAPHED THROUGH THE COURTESY OF THE PENNSYLVANIA MUSEUM OF THE SCHOOL OF INDUSTRIAL ART, PHILADELPHIA.



SPANISH FURNITURE OF THE 17TH AND 18TH CENTURIES



H.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

E. J. LAKE S. J. VAUGHN

W. H. HENDERSON

EDITORIAL

LAW, OBEDIENCE, FREEDOM.

THE greatest service the schools could possibly do for rising generations would be to make them thoroly cognizant of the fact that fundamental and eternal laws operate in all the realms of human life and activities. Of course, the necessary corollary to this is that every violation of a law of nature or society brings sure, even if tardy, punishment. This is the essence of justice—the return of the deed upon the doer.

There is not a more fruitful field in all the educational world for the discovery of laws and for the testing of the validity of the claim that violation of law brings punishment than the field of the industrial arts. That the industrial arts activities have not functioned as fully as they might and should have done in this matter is undoubtedly true. The explanation is not difficult to find. The work has been quite largely artificial and formal. Even if it ever got into the intellect, it seldomly reached the emotions. And the "education" that lies embalmed in the intellect and never experiences the transforming thrill of vital interest and of life's genuine emotions, is barren.

There has been too much dictation. There has been too much copying. There has been too much lifeless routine. The work has been too mechanical. The fundamental laws governing the operations in the various arts have been dealt with as abstractions. They have not become a part of the life of the individual. Progress is being made, to be sure, but we've a long way to go.

It is the business of teachers of the arts to make people conscious of the fact that freedom comes thru obedience to law—not a formal yielding under protest, but a whole-souled, vigorous response to necessary and fundamental rules of conduct.

THE ARTFUL TEACHER.

ART deals with effects that many people overlook. The artist is the interpreter of these effects who by his own original vision is led to express himself in ways that are not common. In this day of industrial and economic interest the teacher who would succeed in the profession of teaching must become an artist in that profession. The artful teacher is the interpreter of effects who by his own original vision is led to vitalize his subject. That teacher who has acquired a general knowledge of the subject taught has only begun preparation for teaching the subject. Most of our school deficiencies can be traced to the inability of the teacher to interpret his subject in a way that makes it vital and important in the mind of the pupil. Of course, school conditions are not what they should be but the American teachers can congratulate themselves on the most favorable school conditions that have ever existed. Pessimistic critics to the contrary; there never have existed in the world's history more favorable conditions for good teaching than are afforded in our public schools.

Above all, the present needs of our schools is the *artful teacher.*

PROPER USE AND DISTRIBUTION OF TIME.

SINCE the time devoted to manual work is so short, it is vastly important that every moment of it be made to count. An hour of time wasted in a manual training shop is a very large percentage of the total time to be given to the subject.

Do boys have to stand for long periods of time and wait for materials, or tools, or the assistance of the instructor? If so, something is wrong. Does the instructor spend a large part of the class period with one or two boys in need of help, while the remainder of the class wait? If so, he is grievously at fault. Does the instructor ever devote his time to his own work while the pupils wait, fool away their time, and become disgusted? If so, he should be fired.

Every boy is entitled to a bit of individual instruction, a brief help over some difficulty, or a word of advice or encouragement on each trip to the manual training shop. The fact that the class period is so very limited is all the more reason why the instructor should so organize his time as to give each boy his share of attention and to eliminate every possible moment of wait and waste.

HERE I AM! TEACH ME IF YOU CAN!

A TEACHER of experience in foreign schools after a brief observance of the schools in our country was asked for a statement of his impression of our methods and facilities for instruction as compared to those of his own country. His answer should be interesting to the American teacher. "Of your methods of instruction I can say little because I know little. Of your school facilities I observe they are very generous and complete but one thing has puzzled and impressed me: it is the attitude of your pupils toward instruction. They seem to need discipline yet I am not sure but that it is the discipline which interest in their work can best supply. They come into class with a resigned and tolerant attitude as if to say, 'Here I am! Now teach me if you can.'"

Every teacher has no doubt observed that "resigned and tolerant" attitude on the part of some pupils and has found it a greater difficulty to overcome than the occasional case of insubordination.

Some conscientious teachers have taken the matter of indifference to a subject as a reflection on the methods

of presenting the subject. Many teachers have conceived that interest could only be aroused in a subject by keeping the pupils very busy and have increased the work for them to do with the thought that a busy pupil must be a good pupil.

To such we would point a difference between being busy and being interested.

"Plenty to do" has been offered as the antidote for mischief. It has not always been effective for mischief makers are proverbially busy and the indifferent pupil is not the mischief maker.

We believe the "Here I Am! Teach Me If You Can!" attitude is the result of prescribed work given to boys and girls as a matter of general education for a purpose which they do not understand and for a result which they cannot foresee. The only method of arousing interest in a particular kind of study is to make that study bear on interests that are perhaps dormant but inevitable in the alert, inquisitive and ambitious mind of the American youth.

ARTLESS ART.

VISITING one of our well equipped township high schools the visitor was "shown thru the building." In the mechanical drawing department some boys were lettering announcements for a coming event. The lettering was well done from the mechanical point of view but from any other view of more than six feet distance the finely ruled letters were too faint to carry. Among the departments visited was a well equipped art department. Here a few posters were on the boards that would carry forty feet but the lettering on them was too fantastic and poorly executed to be legible. "Well!" said the mechanical drawing teacher, "you see I have never studied art. I am a mechanical draftsman." The art teacher confided in the visitor that her interests all lay in the direction of music and the art instruction she was obliged to give was only a makeshift. And so a simple little matter of making a few effective announcements was bungled for lack of capable instruction.

INDUCING THE WAR WORKERS BACK TO SCHOOL.

FOR a year or more, every condition has given impetus to the natural disposition of boys and girls to leave school and go to work. The ranks of workers were seriously reduced by the withdrawal of millions of men and women for the making and support of a fighting force.

At the same time that the workers were reduced in number, there arose an unprecedented demand for increased production along almost all lines. Due to these two facts, alluring wages were offered for all kinds of work. Not only did these conditions entice great numbers of school boys and girls into industry but the needs of the homes, due to the absence of those who had previously been their support, compelled other boys and girls to enter wage-earning employment.

So great were the pressure and the need that in some states, at least, regulations concerning age and conditions of employment were modified to suit the demands. A general laxity, therefore, developed in the matter of employing boys and girls on the grounds of patriotic service.

Whether or not this was wise or in any sense profitable is not the question at present. Now that the emergency is over and that there is considerable anxiety over the matter of employment for the returning soldiers and sailors, great stress should be laid upon getting the working boys and girls out of industry and back into school at the earliest possible moment. Economic laws will help materially, but it will be difficult to induce a voluntary retirement from work and return to school.

The best and surest way for the schools to attract students into them and to hold those already enrolled is to make it known with the support of substantial facts, that in the long run it pays, financially and otherwise, to go to school.

WHEN I look on a group of clean, well-fed, middle-class men of that queer mixed race that we have been in the habit of calling the Anglo-Saxon (whether they belong to the land on this side of the Atlantic or the other); when I see these noble creatures, tall, wide-shouldered, and well-knit, with their bright eyes and well moulded features, these men full of courage, capacity, and energy, I have been astounded in considering the houses they have thought good enough for them, and the pettiness of the occupations which they have thought worthy of the exercise of their energies. To see a man of those inches, for example, bothering himself over the exact width of a stripe in some piece of printed cloth (which has nothing to do with its artistic needs) for fear it might not just hit the requirements of some remote market, tyrannized over by the whims of a languid creole or a fantastic negro, has given me a feeling of shame for my civilized middle-class fellow-man, who is regardless of the quality of the wares which he sells, but intensely anxious about the profits to be derived from them.—*Wm. Morris.*

"THE true root and basis of all Art lies in the handicrafts. If there is no room or chance of recognition for really artistic power and feeling in design and craftsmanship—if Art is not recognized in the humblest object and material, and felt to be as valuable in its own way as the more highly rewarded pictorial skill—the arts cannot be in a sound condition; and if artists cease to be found among the crafts there is great danger that they will vanish from the arts also, and become manufacturers and salesmen instead."—*Walter Crane.*

"I wish every college and every school would have a man who would open up the eyes of boys and girls to an appreciation of what can be found in the printed page, so that we might get in contact with the thoughts and feelings of men and women long since passed away."—*A. W. Wishart.*

THE EASTERN ARTS CONVENTION AT NEW YORK

John J. Hatch. Newark, N. J.

The large attendance and earnest spirit manifested at the Eastern Arts Convention in session at the Hotel McAlpin, New York City, April 17, 18 and 19, 1919, emphasized the fact that Industrial Arts teachers and directors are fully awake regarding the new conditions in education as a result of the war.

The convention opened on Wednesday evening, when an informal reception of members was held in the Green Room of the hotel.

The first general session convened on Thursday morning in the spacious Ball-Room with President Augustus F. Rose in the chair. After a short business meeting and the addresses of welcome, Mr. Richard D. Allen, Assistant Superintendent of Schools, Providence, R. I., delivered a most forceful address, taking as his subject, "Vocational Guidance in the Public Schools as a Means of Discovering and Developing Talent." He suggested that teachers investigate the various traits of children from many angles before attempting to guide them toward a vocation.

The second general session was held on Thursday evening and a very full program was presented. "Democracy and Beauty" was discussed by Dr. Elmer Ellsworth Brown, Chancellor of New York university in masterly style, while "Art Industry and Education" was the subject of Dr. Frank Alvah Parsons' address. Dr. Parsons urged more of the real teaching of art as applied to industry in our schools and decried the teaching of art for art's sake. Miss Elizabeth Marbury, President of the Women's National Committee of the American Defence Society, followed, giving a most instructive discourse on "Reconstructed Patriotism."

The third and perhaps strongest program given at a general session was offered on Friday evening. Dr. Clarence M. Weed, Bureau of Education, Washington, D. C., made a few introductory remarks on the work of "The United States School Garden Army," stating that the motion picture which he wished to show would emphasize more forcibly than words, what could be accomplished by school children when a school garden was properly conducted. The film showing the activities of the pupils at the Mary Hemingway School, Boston, Mass., was a revelation to the audience and further proof of the educational value of this new phase of Industrial Arts was needless. Following this picture, Mr. Frank E. Mathewson of the William L. Dickinson High School, Jersey City, N. J., exhibited a film made at New York University and Dickinson High School entitled "Training the Soldier Mechanic." This motion picture, also amazed the audience. It illustrated the training methods pursued by the Vocational Section of the Students' Army Training Corps and fully demonstrated the value of short intensive courses. A feature of this film showed the building of a bridge across a stream by soldiers, strong enough to be used by an entire army. The time necessary for the construction of this bridge was 26½ minutes—and not a man "got his feet wet." "The arts in Post War Education" was the topic discussed by Dr. David Snedden of Teachers College, New York City. Dr. Snedden was most emphatic in stating that Industrial Arts in elementary schools were for the purpose of giving appreciation, enrichment and experiences to pupils and that vocational training, or even vocational guidance should receive no attention during this period. The latter, he said, should not be given until a boy or girl has reached the age of fourteen. Dr. Frederick B. Robinson, Director of Vocational Subjects, the College of the City of New York, delivered one of the best addresses of the convention. His subject, "The Adaptation of Short Vocational Courses and Their Methods to the General Plan of Progressive Education," seemed to strike a keynote. He insisted that the only way for students to progress in their vocational choice was to come back to general education after each short vocational course. He likened the problem of education to a tree, the trunk of which would be the general education and the branches vocational courses, thus picturing the necessity of returning to the trunk each time to gain the next higher branch in vocation. The next speaker was Mr. Jay Hambidge on "Dynamic Symmetry in Nature and in Greek Art." He showed the audience that Dynamic Symmetry hinges absolutely on a study of mathematics.

The fourth and last general meeting was held Saturday morning at which time Mrs. Annette S. Pascal, Membership Secretary, Art Alliance of America, spoke about "The Merchant's Interest in Industrial Art." She sounded the warning that Art to be *efficient* in these commercial times must go hand in hand with industry. Another very strong address of the convention was that given by Dr. James Parton Haney, Director of Art, New York City. "Industrial Art—Our National Opportunity," was his subject and he stressed the teaching of that Art that has to do with the every day life of the child.

All of the general sessions were largely attended and the consensus of opinion of those present was, that the convention of 1919 would be recorded among the best.

Sectional Meetings.

The Manual Arts Section held two meetings. The meeting of Thursday afternoon brought forth a paper prepared by Mr. A. H. Edgerton of the Lincoln School, Teachers College, on "A Recent Experiment in Junior High School Industrial Arts." This paper was read by Mr. W. A. O'Leary, Assistant Commissioner of Education of New Jersey, in the absence of Mr. Edgerton. "Qualities and Qualifications of the Teachers of Manual Arts" was the subject handled by Mr. John C. Brodhead, Asst. Supt. of Schools, Boston, Mass. His address was discussed by Mr. H. H. Stewart, Director of Industrial Arts, Mt. Vernon, N. Y., Mr. John J. Hatch, State Normal School, Newark, N. J., and Mr. W. R. Ward, Supr. of Manual Training, Trenton, N. J.

The second meeting of this section considered the topic, "Lessons from Intensive Training for War Emergencies." Two very fine films were shown, one picturing the various kinds of work done by the Vocational Department of the National Committee on Education, while the other film depicted the work of the Emergency Fleet Corporation in its Training Departments.

The Household Arts Section held two meetings also. At the first the following speakers appeared, Miss Isabel Ely Lord of Pratt Institute and Miss Helen R. Hildreth, of the Worcester, Mass., Trade School. Miss Lord discussed "The Decorative Side of Home Making," and pleaded for more effective work of this type in the schools. Miss Hildreth reviewed the field of "Vocational Homemaking Work."

At the second meeting of this group, the subject of Art, Dress and Textiles was under discussion. Miss Anna L. Cobb, Editor School Arts Book, Cleveland, Ohio, Miss Zeralda Rains of the N. Y. School of Fine and Applied Art, and Miss M. D. C. Crawford, Design Editor, "Women's Wear," New York, were the speakers. All argued for more efficient teaching, a better understanding and a wider sphere for these subjects in the school curriculum.

The Art Section held two splendid meetings. At the first appeared as speakers, Miss M. Rose Collins of New York, Miss Ethel Traphagen and Mr. Raymond Carter. High School of Commerce, New York City. The audience was especially enthusiastic about Mr. Carter's demonstration in cutting and printing linoleum blocks.

The second meeting introduced Miss Anna Curtis Chandler of the Metropolitan Museum of Art, New York City, and Mrs. Mary Linton Ackerman of Teachers College.

One meeting was also held for the section interested in Ungraded Classes, a meeting for the School Garden Section and a meeting for the teachers of Printing.

Luncheons and Dinners.

"The Get-Together Luncheon" was held Thursday noon and was attended by a hundred or more members from the various associations represented at the convention. Mr. Arthur W. Richards of the Ethical School, New York City, was chairman and called upon members of each club represented to tell about what their particular association was doing in an educational way. The following persons responded:

Mr. John C. Brodhead, Asst. Supt. of Schools, Boston, Mass., "The Boston Manual Training Club."

Miss Eva E. Struble, State Normal School, Newark, N. J., "The Essex County, N. J., Arts Association."

Mr. Wm. R. Ward, Supr. of Manual Training, Trenton, N. J., "The Mercer County, N. J., Industrial Arts Association."

Mr. Walter R. Gale, Baltimore City College, Baltimore, Md., "The Baltimore Arts Association."

Mr. Edwin W. Roberts, Director of Industrial Arts, Stamford, Conn., "The Connecticut Arts Association."

Mr. Martin J. Corcoran, Supr. of Manual Training, Elizabeth, N. J., "The Union County, N. J., Arts Association."

Mr. Laurence J. Young, Asst. Director of Industrial Arts, New York City, "The New York City Shop Teachers' Association."

Mr. J. Winthrop Andrews, Yonkers, N. Y., "The Southeastern New York Arts Association."

Mr. L. Parsons, Supr. of Manual Training, Asbury Park, N. J., "The Monmouth County, N. J., Arts Association."

Mr. Hugo B. Froehlich, Director of Manual Arts, Newark, N. J., "The School Crafts Club" and "The New Jersey Vocational and Arts Association."

Mr. Richards in a few closing remarks, left this warning with the diners, "Watch out that any one of the Industrial Arts does not occupy the stage too long, to the detriment of the others."

The New Jersey Dinner.

The dinner of the New Jersey members was held on Friday and attended by seventy-eight persons.

Mr. Hugo B. Froehlich acted as toast-master and among many others, called upon the following people: Major A. D. Dean, Sanitary Corp., U. S. A., Mr. T. D. Sensor, State Dept. of Education, Trenton, Mr. W. E. O'Leary, Asst. Commissioner of Education of New Jersey, Mr. Alvin E. Dodd, Merchants' Association, New York City, Dr. E. B. Kent, Director of Manual Arts, Jersey City, N. J., and Mr. W. R. Ward, Supr. of Manual Training, Trenton, N. J.

It was unanimously voted that the New Jersey Dinner continue to be held as an annual feature of the Eastern Arts Conventions.

Mr. Froehlich, at the conclusion of the dinner said: "Industrial Arts has come into its own. The schools are just arriving at the time when Industrial Arts must be expanded. We are facing new conditions. The times have forced us to the swift accomplishment of aims and ends which before the war were slowly formulating in our minds. In the schools our well regulated and long established courses of study which hitherto have moved like clock-work, checking off recitation, examination, and graduation with little heed of the practical things of life have collapsed like houses built of cards. Great waves of public sentiment are demanding that the schools function in immediate and definite contribution to the country's need. Our long-awaited opportunity is here. Let us be up and doing."

Massachusetts Normal Art School Luncheon.

A large number gathered at this luncheon and listened to short informal remarks by Frederick W. Reid, State Normal School, Framingham, Mass., Royal Bailey Farnum, Mechanics' Institute, Rochester, N. Y., and Augustus F. Rose, School of Design, Providence, R. I. All the speakers were generous in their praise of the good work that has been accomplished by the Massachusetts Normal Art School and its national influence.

Pratt Institute Art Alumni Luncheon.

"A big success" was the verdict of all who attended this luncheon. Miss Georgia B. Everest, Supervisor of Classes, Pratt Institute, was responsible for the excellent arrangements, while Mr. Walter Scott Perry, Director of the School of Fine Arts at Pratt, was toastmaster.

Other Luncheons.

The Alumni of the Pennsylvania Museum and School of Industrial Art held a luncheon in the restaurant of the Metropolitan Museum. Mr. Charles T. Scott was chairamn and Mr. Otto F. Ege and Mrs. Mary E. Marshal responded to toasts.

The Teachers College Alumni Gathering took place at Ye Peg Woffington Coffee House in East 44th Street on Friday evening. Prof. Grace Cornell, Mr. Clyde A. Bowman, Mr. Charles J. Martin and Mr. Herbert R. Kniffen were among the speakers.

At the final business meeting, the following officers were elected for the ensuing year:

President: Mr. Frank E. Mathewson, Director of the Technical Department William L. Dickinson High School, Jersey City, N. J.

Vice-President: Mr. Raymond Carter, Chairman of Art Department, High School of Commerce, New York City.

Secretary: Mr. A. W. Garritt, Assistant Director of Shopwork, New York City.

Treasurer: Mr. Almond H. Wentworth, Director of Art, New Haven, Connecticut.

Chairman of Editorial Board: Miss Florence O. Bean, Department of Manual Arts, Boston, Massachusetts.

New Council Members to serve three years:

Mr. Ernest Watson, Pratt Institute, Brooklyn, N. Y.

Mr. Edward C. Newell, Board of Education, Springfield, Mass.

Miss Cora M. Winchell, Teachers College, New York City.

Mr. Edward C. Emerson, Department of Manual Arts, Boston, Mass.

SCHOOL CRAFTS CLUB SMOKER.

The School Crafts Club held a smoker in the green room of the Hotel McAlpin, New York City, on Friday evening, April 18th, to which all men in attendance at the Eastern Arts Convention were invited. About a hundred men spent an enjoyable evening.

Mr. Hugo B. Froehlich, president of the Club, acted as chairman. Maj. Arthur D. Dean talked on "Opportunity School" vs. "Cafeteria School." He described the work being done at the Denver Opportunity School and pointed out the manner in which it is meeting the demands of democracy in the schools.

Following Major Dean, Mr. John C. Broadhead, Boston, Mass., extended to the club members the regards of the Boston Club.

On the afternoon of April 18th the club enjoyed an excursion to the shipyards at Newark, N. J. The excursion took the place of the regular April meeting of the Club and was attended by one hundred members. After a tour of inspection about the plant the men assembled in the administration building where a program was given. Mr Hatch, chairman of the meeting, introduced Mr. Harry H. Tukey, educational director of the yards, with the statement that the training department at Port Newark is considered the best in the country. Following the address, several members spoke words of thanks for the opportunity offered and pronounced the meeting a fitting climax to a splendid convention.—*Richard A. Beyer.*

The Manual Training Department at Jackson, Minn., has made twenty tables for shipment to the devastated sections of France. The parts for the tables were constructed in the school shop on the factory production plan. The entire work, including the finish and crating was done by the students under expert supervision.

INEXPENSIVE SCENERY FOR A HIGH SCHOOL PLAY.

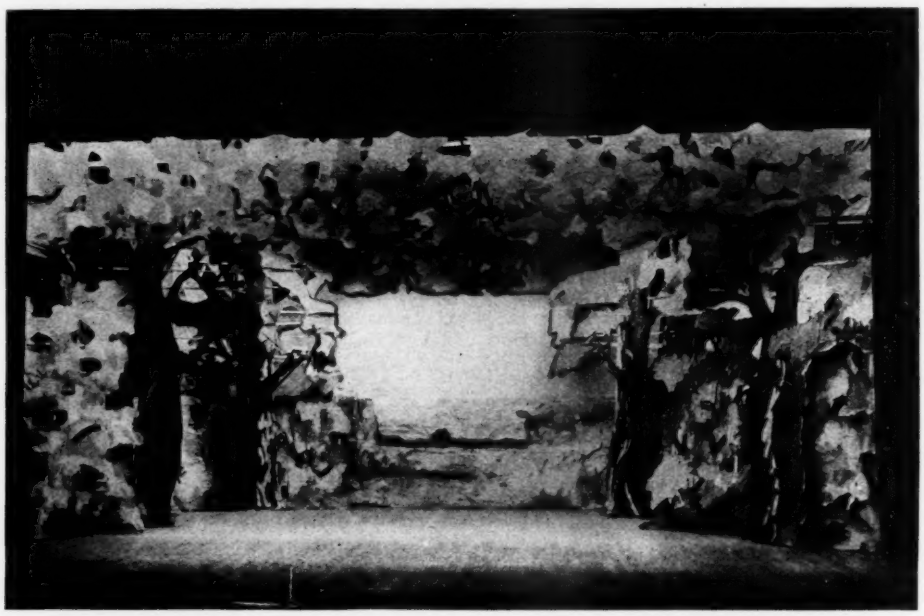
Rachel L. Skinner, Art Instructor, Champaign High School, Champaign, Ill.

The writer's art department was asked to cooperate with the dramatic department in staging a little musical comedy. The art students' part was the production of an outdoor effect in scenery. We were allowed a very small sum for our equipment. After pricing different materials it was decided that the only material we could afford was wall paper. We purchased 25 rolls of heavy oatmeal paper in tan and proceeded to make three front drops, four huge trees, seven bushes, and a back distance.

The students did all of the foliage painting with alabastine, of which we were able to secure two shades of green and a light yellow, at thirteen cents a pound. We used three pounds of the light green, three pounds of the dark green, and one pound of the yellow. The trunks and branches were painted purple, yellow, and orange with oil paints. Alabastine comes only in light shades, so it could not be used for the shadows, trunks and branches of the trees.

All of the drops were the length of the stage, which was about 40 feet. It was necessary to make one of the drops wider than the width of wall paper, so we pasted two widths together. For the others one width was sufficient. After measuring the length necessary for the drops, we drew in the design, and cut out the "sky spaces." The bottom of each drop we made very irregular. We then proceeded to paint. Three students painted with the light green, three with the dark green, one with the yellow, and two each with the purple and yellow oil paint. In this way team work was brought into play. We were forced to do all of our work on the floor, as we had no tables large enough. The drops were not difficult to make, but were rather clumsy to handle. As soon as they were finished we tacked them up on the frames of the old worn out canvas drops.

The trees were the hardest proposition. They measured from fourteen to sixteen feet in height and were about eight feet wide in the widest places. For the branches of the trees we were obliged to paste three widths of the wall paper together. After the trees were pasted, drawn and cut out, we turned them over on the wrong side and pasted strips of chip board on the backs. These strips were about 1½ inches wide and 36 inches long. At least fifty strips were pasted on each tree—up and down and criss-cross. This tedious job completed, we turned the trees over and painted them as we had done the drops. The next problem was to make the trees stand up. Four old beaver board pillars and an old green porch screen were found on the stage. We took the screen to pieces. The separate laths were weak, so we tacked them in pairs. Then we wove these laths in and out among the branches and the foliage to make the tops of each tree secure, regardless as to whether the wooden strips were on the back or front of the tree, sacrificing everything to strength. We also put braces of laths cross-wise, for strength. In order that the pieces of laths visible here and there might not be seen by the audience we painted them over as we had painted the trees, using green for the foliage, purple and orange for the branches, and white for those parts of the laths which might have filled up any sky spaces. In this way the laths were made almost unnoticeable. Next we fastened the trees onto the pillars very securely with nails. To make them stand erect we fastened brackets to the back of each pillar. In order that the trees might be folded away later on, these brackets were hinged, instead of being nailed on at right angles. When we got them placed, much to our joy the trees stood up beautifully.

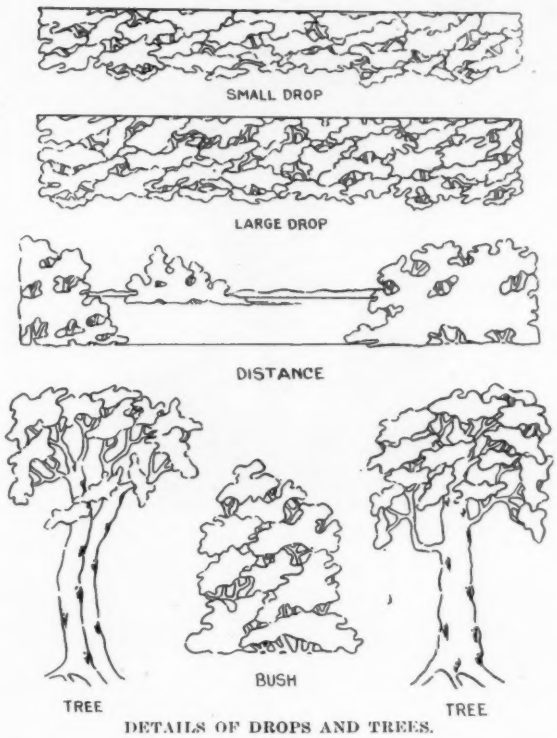


SCENERY MADE BY THE AUTHOR'S STUDENTS IN THE CHAMPAIGN HIGH SCHOOL.

The bushes ranged from six to ten feet in height, and from three to six feet in width. We painted them in the same manner as we had done the trees, and fastened them to improvised lattice frames. The distance, as the drops, was 40 feet long, and two widths of wall paper wide. We painted in the distance very lightly, to make the hills look miles away. An old light blue canvas curtain served as the sky, and we pinned the distance to it.

I think I should not attempt wall paper scenery the second time. but it was necessary as a beginning, to show the school authorities that we could make scenery, and make it successfully. Our next attempt at scenery, I hope, may be on beaver board or canvas.

The problem gave the boys and girls a practical commercial problem to solve. It taught them how to make scenery with very little equipment. It enabled me to meet my students in an entirely different way from the ordinary routine of school work. My idea of one boy changed completely. All year this boy had come to class late at least twice a week and has seemed listless and bored. I had kept



DETAILS OF DROPS AND TREES.

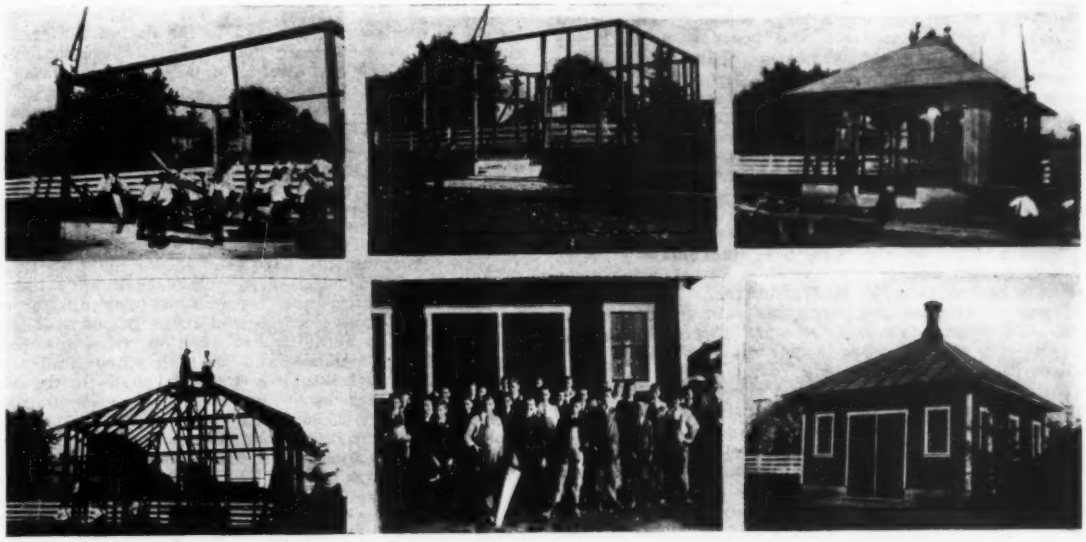
him after school to make up time, and tried all sorts of devices, in vain. When we took up the scenery proposition he became immensely interested and gave me very valuable advice from time to time. He came early to school to help me, and even came in after hours for the same purpose. There was no fooling about him. He knew just what to do at the right time. He seemed to shoulder almost as much responsibility as I did, and was as much concerned about results. I know this boy in a different way now, and am confident that we shall get on a great deal better in the future. I have discovered the kind of problem that he requires.

What happened in the case of this individual was more or less true of the class as a whole. Altho the informal way in which we worked gave every opportunity for fooling and wasting time, there was very little of this. The modern drawing teacher cannot afford to let slip any opportunity so valuable in all ways to herself, and of so much practical benefit to the school.

STUDENTS BUILD THEIR OWN FORGE SHOP AT LAMPETER, PA.

The West Lampeter Vocational School was in need of a forge shop. To complete the course in farm shopwork there developed a need for more practical work of bigger demands. The two needs met each other and the boys built a shop. Having carefully made plans and having had these plans criticised by a professional carpenter, the Agricultural Department began work in September, 1918. The plan as the illustrations show was for a hip roof building 24′ x 24′ x 12′. The roof is one-third pitch and the framing is almost entirely of 2″ x 6″ stuff. The floor only was built by professional workmen. It is of concrete and was finished when school opened. This was not done by students because the task was too large for hand mixing and the boys had had other practice in cement work. It is not thought desirable to force the boys to continue hard work long after they cease to learn from a project being done.

With the opening of school the materials were all at hand and the details of the plans drawn up. The pictures show the progress of the job better than words can explain it. It might be explained that the boys did not spend all their time at this work. They had their other recitations in the academic and agricultural departments during most of the day except during their shop and laboratory periods. A plan that worked very well with the boys and saved trouble for the supervisors was a squad system of working. A leader who had shown that he was clear-headed and a steady workman was chosen. He was detailed with a squad of three for a definite task. Instructions would be as follows: "Paul, cut that tongued and grooved stuff to twelve foot lengths." "Harry, nail on that siding." "John, you may take charge of the sheathing of the north side of the roof." This responsibility put on the boys themselves made the training more beneficial and the work more efficient. They worked better and bothered the supervisors less with little questions. The shop was roofed and painted and ready for use before December 1st. The indoor plan is simple. Six forges will eventually occupy the space. Now the size of classes is such as to demand only three forges. The remaining space is occupied by the Ford used for visiting home projects of the boys and doing other extension work. All the



PROGRESS PICTURES OF THE FORGE SHOP AT THE WEST LAMPETER SCHOOL.
The building in course of construction, the class and the completed shop.

smoke goes out the ventilator at the point of the roof. This includes the smoke that does not go up the individual flues.

The project tho a big one for a school to tackle was worth while. The boys now have the confidence that they could build a poultry house or implement shed themselves. They have kept their motto, "We Learn by Doing."

INDUSTRIAL PROBLEMS IN RURAL SCHOOLS.

Heman J. Barber.

Manual training in rural schools needs only a competent teacher to become a source of interest and profit. The farm boy is raised in an atmosphere of making useful things in a crude but efficient shape. With the simple tools on every farm he helps make and repair the things needed in daily life. In my own experience I made the chicken coops, feed troughs, hay racks, sleds and such things as were needed for the farmwork. Being inclined to "tinkering" I repaired the windmill, the harvester and even the sewing machine. I had dull and rusty tools and much of my material was the logs and poles from the woods, the rough boards from the nearby sawmill and the scraps of iron and wire from the farm "boneyard." With the advent of modern machinery the farm boy has an infinitely broader field for such work and the rural teacher a corresponding opportunity.

Having traveled the country many summers as a harvest machine expert, from Texas to Western Canada, I have been amazed at the number of farm shops with an equipment of blacksmithing and wood working tools for keeping the farm equipment in order. The universal use of gasoline engines, both stationary and for automobiles and tractors, is developing a race of boys who are resourceful and fairly skilful. Farm lighting plants are spreading a knowledge of electricity and the use of such appliances as washing machines, electric sewing machines, tool grinders, etc., that compares favorably with the knowledge of the shop-trained city boy.

To be explicit I visited a large rural school in Kansas in July that I offer as a model. One large room, electrically lighted and supplied with electric fans for summer use, is the community center and school assembly hall. The basement is large and well lighted and ventilated. It contains a farm lighting plant of large size; the gasoline engine that charges the storage batteries is belted to a band saw and other machines. The making of molds for such useful things as fence posts, stock watering troughs, sanitary hens' nests, and ornamental flower boxes to be cast in concrete, will be a real contribution to the needs of the community. Two wealthy districts combined to build this school and men of broad vision planned the building. Not all the schools can secure these advantages and many cannot secure the teachers to do the work but all can start something worth while.

One little school south of Chicago saw a vision and the boys of this school dug out a large basement and walled and floored it with concrete, the board furnishing the material. A hot air system of heating, with a stove in the basement, also furnished heat for the basement and a few tools were bought from the proceeds of an entertainment. Here the boys make the things they can use in their homes and learn the simple tool processes in wood and iron work. A portable forge and a good vise and anvil permit considerable repair work. A concrete block machine is their next want and the skill gained, under a competent foreman, in the concrete work on their basement, is showing in walks, basement floors, water troughs, etc., in the neighborhood. The teacher is not an expert in these lines but is growing with his classes and is an insatiable seeker after more knowledge and more skill. Having taught a country school some years, I realize the impossibility of teaching eight grades and doing much special work like this, but the beauty of it is that the work largely runs itself if properly handled.

An ordinary one-room school, I have in mind in Cook County, Illinois, has one end of the cloakroom equipped with a rough but serviceable bench and a few essential tools. The boys work mostly after school and furnish their own lumber which is usually old packing boxes and even broken fence boards. The teacher does not attempt drawings or blueprints but encourages the boys to develop their ability in their own way. Some really serviceable bookcases were made from packing boxes, homemade sleds, skis, etc., were made during the winter and many farm tools of the simpler kind were repaired. This was not equal to the other two schools I described, but was the right start toward greater things.

The rural teacher needs great good sense and judgment on how to meet special conditions. Find what the community needs and interest the boys in starting something. Then put all the power of your earnestness in it. A saw, hammer, plane, square, and brace and bits, used wisely this winter, may mean a shop with tools for work in wood, iron and concrete in the future. Keep in close sympathetic touch with your patrons and they will finally help you realize your ideals.

MR. JOSEPH F. PARKS.
Supervisor of Industrial Education, Wichita, Kans.

Mr. Parks is a Texan by birth and early education. His professional training was received at the Kansas State Manual Training Normal School, Bradley Institute and the University of Wisconsin. He has taught in Kansas and Iowa and since 1913 has been supervisor of the industrial education department of the Wichita schools.

Mr. Parks has recently completed and published a new course in woodworking for the Wichita grades, which is attracting wide attention.

SCHOOL ARTS LEAGUE ISSUES EIGHTH REPORT.

The School Art League of New York was able to maintain its work thru the period of the war and to continue its helpfulness and wise counsel to many students seeking to develop their art talent. The war brought home to the people, to the businessmen and to the nation the need for higher standards of taste and for better productions in industrial art and the coming of peace has increased the need for this service many-fold.

The League, in its latest report, urges the foundation of industrial art scholarships. In support of the success of its work, the League points to a total of twelve pupils who are under instruction for postgraduate work. During the past year the work was for the first time actively entered into by the high school art department, and the various schools are now cooperating in the maintenance of art scholarships.

The report for the past year shows that the League reached nearly 40,000 children and teachers thru lectures and exhibits. Thirty-three lectures and meetings for children and for members, were given at the Brooklyn Museum and the Fine Arts Building. In addition, there were Saturday lectures for members and for high school students in the morning, and talks for elementary pupils in the afternoon. The docent spoke in 76 school auditoriums and classrooms before 25,869 elementary pupils and met 126 classes of 5,239 children at the Metropolitan and the Brooklyn Museum, reaching in all 31,108 young people.

The league was sponsor for an exhibition of craft work of high school pupils during June, 1918, at the Art Alliance of America. Twelve industrial art scholarships were awarded during the year as well as 491 fine craftsmanship medals, which went to the workshops of the elementary schools.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A CHAIR.

W. W. White, Davenport, Ia.

The accompanying illustrations show a chair designed and made by a fourteen year old boy in the writer's class. It is the result of the work done in the correlated mechanical drawing and woodworking classes, offered in the first year of high school. The boy was given no help beyond a group of suggestive panels for the back of the chair which he modified considerably from those which he studied.

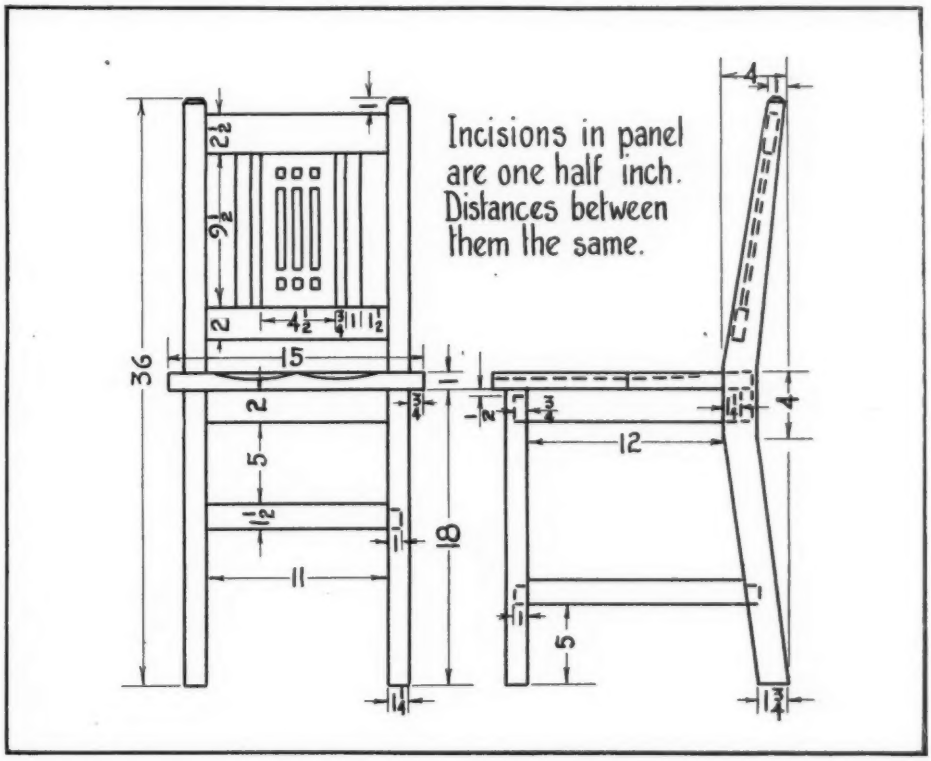
COMPLETED CHAIR.

A WAGON.

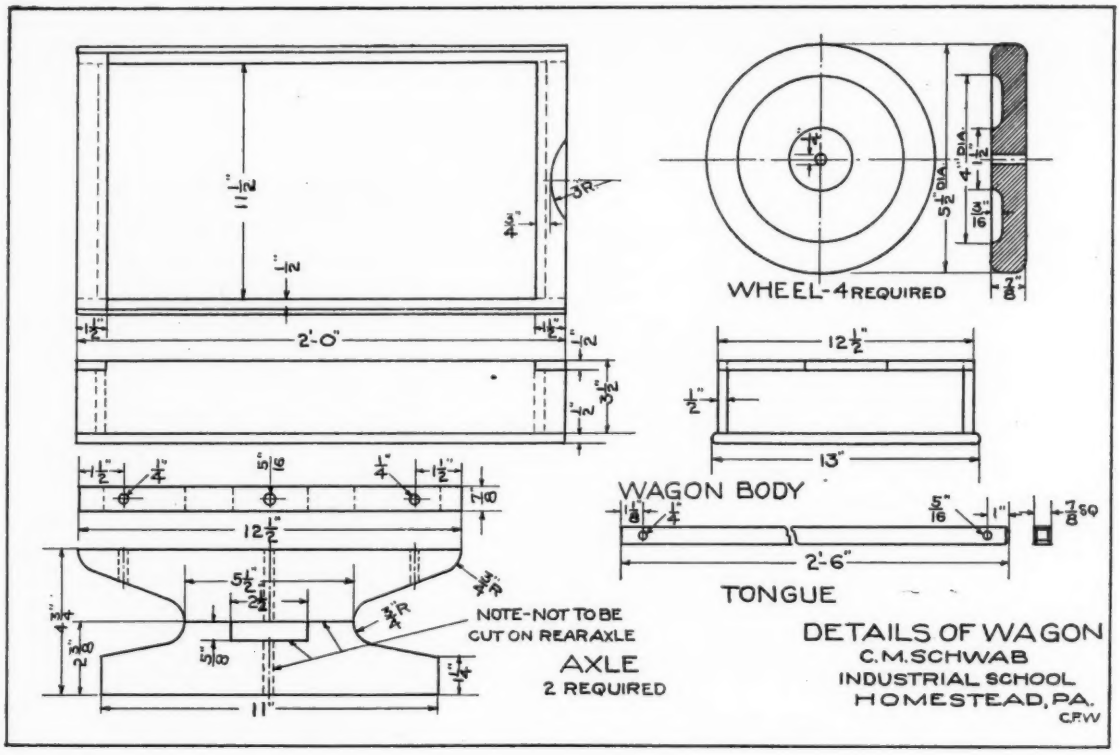
C. F. Wintersteen, Homestead, Pa.

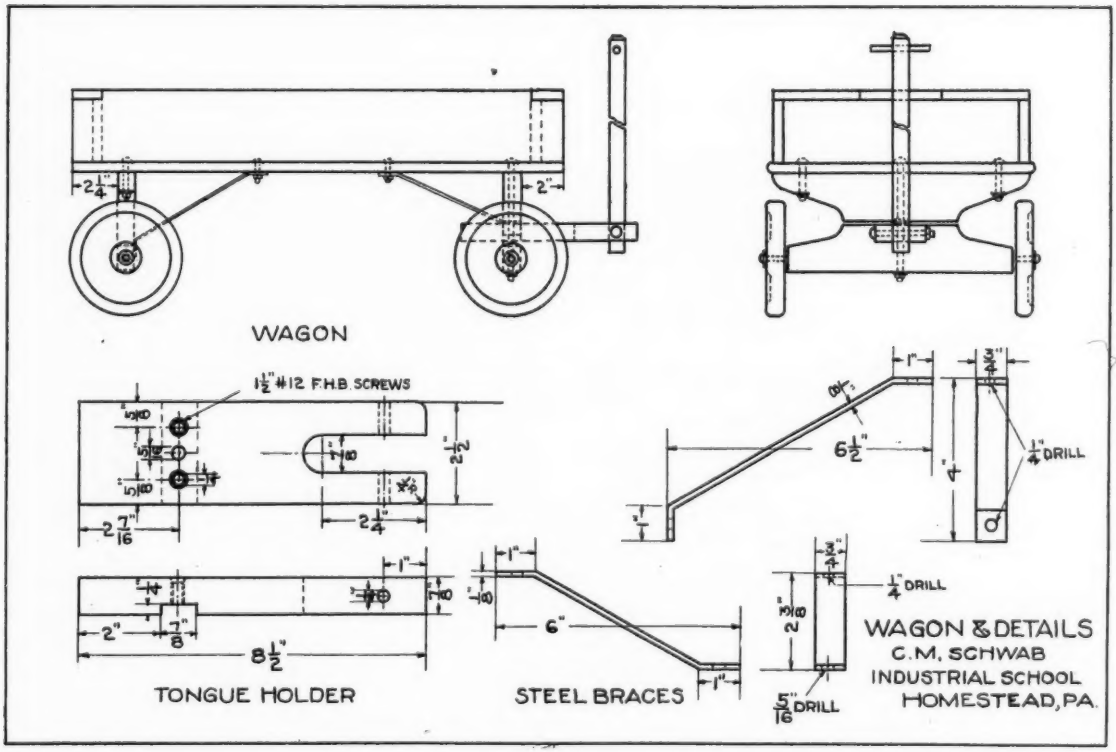
Boys are always interested in designing and making projects with revolving parts. The wagon shown here was designed and drawn by a class taking elementary woodworking and turning.

As in actual drawing room practice a layout was made to large scale. The general proportions fixed, each part was detailed on uniform size paper with the larger parts drawn full size. Three different designs were made in order to have a choice and to give as many as possible a part in the work of detailing, checking, tracing and blueprinting. Altho not necessary, it was decided to make a detailed drawing of the screws, bolts and washers to give the boys a picture of just what was wanted. Including the assembly there were six tracings. Several books of blue-prints were made and taken to the shop where a number of wagons were constructed, and they were entirely satisfactory. In order to simplify the design iron parts were eliminated, with the exceptions of the braces which are easily made. The wheels are fastened with three inch No. 14 screws. (Kiddie Kar construction.) If the box is



CHAIR DESIGNED AND MADE BY NINTH GRADE BOY.





DETAILS OF WAGON DESIGNED AND MADE BY BOYS IN SCHWAB INDUSTRIAL SCHOOL.

made of poplar, and the framework of good straight grained maple, the wagon will be sturdy and stand much abuse. Two colors of stain or paint adds greatly to the appearance. The drawings are clear and self-explanatory and the design is submitted with the idea that it will give variety to the usual wood-shop problems. The original drawings were submitted to the publishers but owing to the difficulty of reproduction the condensed drawings accompany this note.

Bill of Material. Hardware.

4 R. H. Blued, Bright, or Brass 3″ Screws, No. 14.
1—¼″ x 3″ Wagon Bolt.
1—5/16″ x 6″ Wagon Bolt.
4—¼″ x 2″ Wagon Bolt.
2—¼″ x 1″ Round Head Stove Bolts.
1—¼″ x 1¼″ Round Head Stove Bolt.
18—5/16″ Washers.
2—1½″ No. 12 F. H. B. Screws.

SMALL VISE FOR WOOD FINISHING.

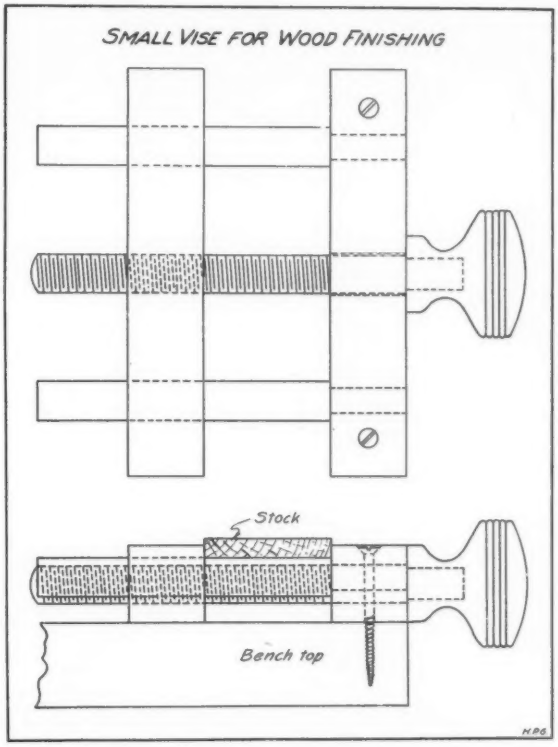
H. P. Gerber, The Northern Normal and Industrial School, Aberdeen, S. Dak.

For several years we have been offering a course in wood finishing as a separate subject. In this course students produce various finishes on small samples of the woods used in cabinet making and interior trim. Everything worked well until we came to the pumice rubbed finishes, when it became apparent that it would be a great help to have small vises to hold these pieces of stock while they were being rubbed.

Since our finishing room was not equipped with vises we moved to the woodworking shop. This practice, however, met with disfavor for two reasons: (1) the wet pumice was not the best thing for our benches, and (2) the class work interfered with the regular woodworking classes. The necessity for special vises then impelled us to design this little vise.

It was made by the classes in wood turning and bench woodwork. As a correlated problem in these two branches it is not only very interesting, but is of practical value especially for the work in wood finishing as we conduct that course.

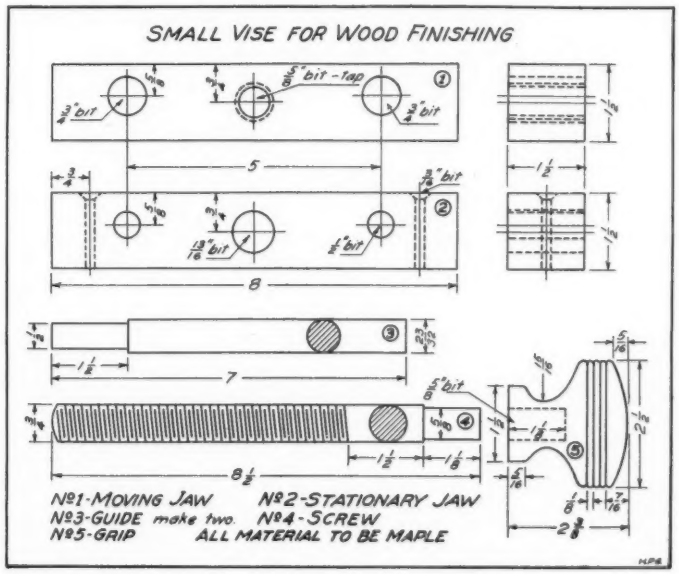
By carefully examining both drawings it will be found that the two guides are centered above the screw to prevent the stock from touching the screw and to keep the upper surface above the jaws. Wherever the guides and screws must be allowed to move freely in the jaws the holes have been bored large enough to allow for this; even tho the parts should became swelled from the moisture caused by the pumice rubbing.



ASSEMBLY OF VISE.

The front jaw is held fast to the bench top by means of two wood screws while the rear jaw is drawn up by means of the vise screw. It is strong enough to hold work for light planing and sanding.

A screw box and tap were used for threads, which are similar to those found on the ordinary wood handscrew.



DETAILS OF VISE.

TABLE LAMP TURNING PROJECTS.

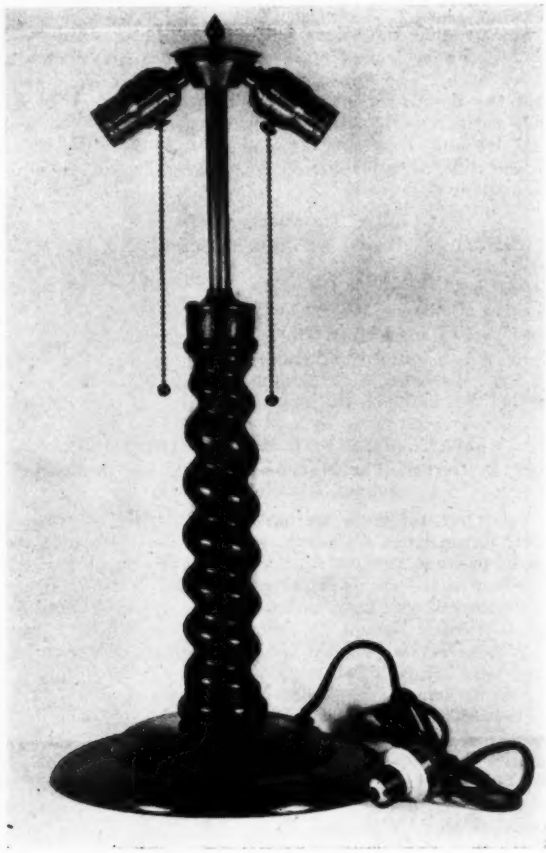
Robert H. Chandler, Oak Park, Ill.

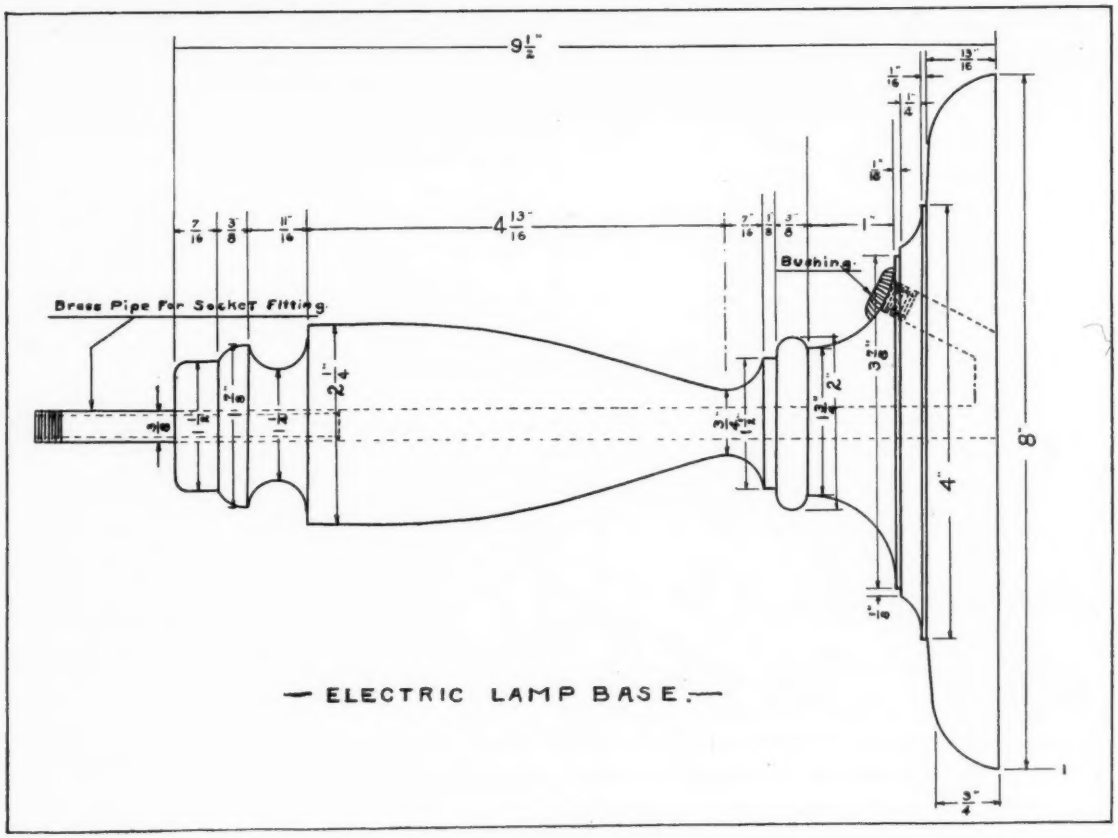
One of the most popular and interesting projects in my wood turning classes this year has been table lamp bases. Making the lamps has been largely an individual problem as to design, altho the dimensions as to height of upright and width of base are held within certain limits.

A problem of this sort has fine educational value and stimulates individual design. The tool processes combine face plate and spindle turning and include a fitted joint. A knowledge of wood finishing is acquired and to wire a lamp properly when it is finished requires some knowledge of electricity.

Gumwood and birch were the principal woods used for the bases. After they were turned and carefully sandpapered, they were stained dark mahogany and finished with four coats of quick drying varnish, rubbed after the first and second coats with 00 sandpaper and after the third and fourth coats with powdered pumice and water, then polished with liquid wax.

Fittings for the lamps can be obtained in a variety of styles, but for a single lamp we generally used a piece of brass pipe or tube





— ELECTRIC LAMP BASE —

about four inches long, threaded with ¼" pipe thread on one end. This was driven into a ⅜" hole bored thru the center of the upright. The lamp socket screws on the threaded end.

The lamp shade clamps on the globe by wires in the frame or rests on the top of a globe attachment which can be bought for that purpose.

The spiral upright on the lamp shown in the illustration was worked out in the following manner: a cylinder for the upright was turned to the largest dimensions required, then a heavy cord was wound tightly around it on the pitch angle of the spiral. A pencil line was then drawn with the cord as a guide. A saw kerf about one-fourth of an inch deep was next sawed following the pencil line. A groove about three-fourths of an inch wide was carved out by hand with the saw kerf as a center line, making a spiral groove around the cylinder the required length. The work was next revolved slowly in the lathe and by following the groove with a rat-tail file and coarse sandpaper, gradually worked down to the proper shape.

A BUTTERFLY BLOTTER.

Catherine M. Richter, Colorado State Normal School, Gunnison, Colo.

Children like to make things which they know to be useful; so when I told our pupils they were to make some pretty blotters, such as the one I had there to show them, they were all eager to begin. We first talked about butterflies, discussing habits, characteristics, and details of physical structure. Then, standing before the class, I cut from a folded oblong of thin paper, a simple form, cutting the outside first. After this, the children were given scrap paper, and their teacher had them cut, continuing this until the average child could cut a characteristic form. The children worked at home also, ever striving for the "best butterfly," as I had offered prizes for the three best blotters, the first prize being a blotter I had made, the other two blotters being made by High School girls.

When the class had cut good forms, I gave another demonstration, this time cutting away the paper, so as to leave the veining, characteristic of butterflies. When this final portion of the problem had been made, the children were allowed to select their own color schemes. Most of them cut black forms, superimposing them on bright or light-colored coated papers. Each child made his blotter in every detail, selecting and cutting blotting papers and the accompanying cover papers, fastening with brass fasteners, and pasting the body of the butterfly over this, leaving the wings free.

I then held "concour," placing all the blotters together, picking and choosing till I had selected the winners, and classifying the others in second, third or fourth place. We were surprised with the good taste displayed in choosing color harmonies, and in the skill which the cutting showed, for children not practiced to any great extent in either sense.

Cut-paper butterflies are really fascinating; there is an airiness and delicacy about them that is very appealing; and made in this way, there is a great range for delicate or rich coloring, as the case may be. It is interesting to interpret real butterflies in form and general coloring, both greatly simplified of course. I find it easier to cut the antennae attached to the wings, as in the model shown, as they are then less liable to destruction. We use black-coated paper for the outer form as a rule, using one, two or three different colors of coated papers for mounting, for one butterfly; and again, rice paper, tinted to conform to the original is quite effective for the colored portions. The blotter displayed here was made by a high school girl; it is cut from black-coated paper and mounted on yellow; then pasted onto green cover paper, and black blotting paper, the latter two fastened together with a brass fastener.

This motif can be used also for decorating place cards, valentines, corners for blotter pads, and similar articles.

BUTTERFLY BLOTTER.

TO PREVENT STAINING THE HANDS.

Charles A. Wardner, Springfield, Vermont.

While decorating wood with stains or dyes or while working around an automobile engine, the hands often become annoyingly discolored or stained. To prevent this the following solution has been used successfully: Shave up into shreds three ounces of white or paraffin wax and place it in a jar together with five ounces of olive oil. Melt the wax by placing the jar in boiling water and thoroly mix the wax and oil.

When the mixture has cooled sufficiently dip the fingers and hands in it and they will be protected by a thin film of the wax which will prevent chemicals or stains getting to the skin. This coating of wax will not interfere with the free movement of the fingers as gloves or rubber coverings do, and the wax may easily be removed after it has served its purpose by simply washing the hands with hot water and soap.

TO GET A FIFTEEN DEGREE ANGLE.

Charles A. Wardner, Director Co-operative Trade Schools, Springfield, Vermont.

In teaching a beginning class in Mechanical Drawing it is often very difficult to get the students to understand how to get a fifteen degree angle readily with the ordinary T-square and triangles. After many years' experience teaching, the following plan was successfully tried: The students were told that placing one angle *on top* of another added the two angles, as 30 on the 45 made a 75 degree angle. But placing one angle *underneath* another angle subtracted the lower angle from the upper one, as sliding the 30 underneath the 45 subtracted the 30 from the 45 and left 15. Or sliding the 45 underneath the 60 subtracted the 45 from the 60 and left 15 degrees. This was very readily grasped by the students and they did not forget how to find a quick and convenient position for the triangles to get a fifteen degree angle.

NEW BOOKS.

Sewing: Handicraft for Girls.

By Idabelle McGauflin. Cloth, 116 pages. Price, $1.35. The Manual Arts Press, Peoria, Ill.

During the past eight years this book has been widely used because of the very practical five-years' course which it outlines and illustrates. It has the merit of requiring what can be comfortably completed in the average school in the time allotted. The present edition is revised to include some supplementary material which the author and other teachers have worked out in the practical use of the book.

A Laboratory Course in Physics of the Household.

By Carleton J. Lynde. Cloth, 146 pages. Price, $0.90. The Macmillan Co., New York.

This well arranged course of experiments and studies may be used independently in any college household arts department, but it is prepared especially to accompany the study of the author's work on the physics of the household.

The Instructor: The Man and the Job.

By Charles R. Allen. Introduction by C. A. Prosser. Cloth, 12 mo, 373 pages. Price, $1.50, net. J. B. Lippincott Company, Philadelphia.

This book is an entirely new type of professional textbook and both in style and content is a welcome relief from the standard pedogogic text of years gone by. The author takes up in a very practical matter-of-fact way, the problem of training men in industrial plants, and outlines a complete method of analyzing and classifying trained knowledge, of establishing an instructional order, of preparing lessons, of teaching the lessons, of managing the shop school and of organizing general vocational classes. The book should appeal not only to directors and teachers in corporation schools, but to all instructors of vocational subjects because it includes within the discussion of its specific topic practically all of the fundamentals of teaching trades and of imparting instruction in the theoretical subjects which are directly related to trades and industries. Probably the best recommendation for the book lies in the fact that it is the result of methods which the author has actually applied himself in Massachusetts, and that the principles which it lays down have been evolved from this practice.

Grade Woodwork.

Joseph F. Parks, Supervisor of Industrial Education. Boards, octavo, 111 pages. Price, $0.50. Published by the Wichita, Kans., City Schools.

This book has been prepared as an outline of woodwork for the use of boys in the sixth, seventh and eighth grades of the Wichita schools. It is the result of the author's long experience as a supervisor and is intended to give information on tools and processes, and on details of the shop problems. It includes complete drawings for upwards of a hundred problems. Blank spaces are provided for notes and supplementary problems.

Prevocational and Industrial Arts.

By Harry E. Wood and James H. Smith. Cloth, 266 pages. Atkinson, Mentzer & Co., Chicago.

This book is representative of two distinct tendencies in school shopwork. It indicates clearly that the work of the grades from the sixth to the ninth is growing more prevocational and broad from year to year, and it points to the demand which teachers are making for textbooks which they can place in the hands of students of individual study and reference.

As its title indicates, the work is a text for industrial arts courses which have a strong prevocational purpose. It offers well-rounded and logically arranged descriptions and discussions of the fundamental processes, materials and tools of seven leading lines of industrial work—wood working, concrete, metal working, printing, leather work, agricultural mechanics and electric wiring. In addition, each section offers a number of simple problems which afford a practical application of the text.

Approximately one-half the book is devoted to wood working in its various aspects. The authors have done so apparently on the well based theory that by this means they will convey the largest number of tool and process facts and impart the widest knowledge of general principles of working materials, drafting, etc. While the subsequent sections are rather brief, they are adequate and entirely typical. Thus, leather work is limited to shoe repairing; paper to printing and simple binding and electricity to bell and house wiring.

The authors suggest that the book is not intended to offer a course of study, but that the sequence of work remains with the individual instructor who best understands his local situation. We cannot help but feel that a book like the present will do much to stabilize courses and to force attention on more specific purposes and more inclusive correlated study.

The book is excellently illustrated with line drawings of uniform style.

Staining and Polishing.

Boards. 218 pages. Price, 87 cents, net. Evans Bros., London, England.

A practical and very complete book. It will appeal especially to teachers who are familiar with British trade names. The appendix contains recipes for stains, polishes and fillers for a wide range of purposes.

PUBLICATIONS OF INTEREST.

Exhibition Catalog of Industrial Art Education, New York City art, trade and vocational schools. Price, six cents. Art Alliance of America, 10 East 47th St., New York. Contains a list of art, trade and vocational schools invited to exhibit phases of industrial art work and names of directors. There is also a list of various industries which depend upon design and fine craftsmanship and who need the training that a well equipped industrial art school can give.

Training Labor for Peace Time. Training Bulletin No. 5, Department of Labor, U. S. Training Service, Washington, D. C. This pamphlet points out that the money, time and effort invested in the training of labor in war industry should not be lost now that the country is going back to peace time conditions. Practically every craft and every occupation represented in the production of materials, munitions and supplies for the business of war can be used in the permanent enterprises of peace. The pamphlet discusses industrial training for the workers in industry, safety first and the relations of the businessmen and manufacturers to the training of workmen.

Statistics of Agricultural and Mechanical Colleges 1916-17. By Benjamin F. Andrews. Bulletin No. 41, 1918, U. S. Bureau of Education, Washington, D. C. This bulletin is of special significance in relation to the war, inasmuch as it shows the institutions which have cooperated with the government in furnishing quotas of men with military training and those which have added courses for the promotion of efficiency in the home and agricultural life of the community at large. The figures show that the approximate loss in students and instructors on account of the war is about twenty per cent of the total enrollment.

Standards in Manual Arts, Drawing and Design. By F. D. Crawshaw and W. H. Varnum of the University of Wisconsin. Bulletin No. 941, High School Series No. 17, University of Wisconsin. The bulletin offers general suggestions in methods of teaching and in outlines of courses of studies for the common divisions of the public schools, including the industrial school. It does not prescribe what shall be taught in a particular subject, school year or type of school, but it does offer a definite educational program in the field of the manual arts. The pamphlet which includes a very good bibliography on manual arts work is the most helpful we have seen in several years.

The Industrial Education Survey of the City of New York. Part I, Printing Trade; Part II, Electrical Work; Part III, Carpentry and Joinery; Part IV, Machine shop Practice. Report of the Committee authorized to make the survey by the Board of Estimate and Apportionment of New York. The first part traces the history of the printing industry, points out recent developments in the trade, and makes a careful study of the different departments of the trade, the advantages of the trade and opportunities for training.

The second part dealing with electrical work, outlines a brief history of the trade, and makes a study of wage scales, employment, different phases of the electrical trade, and outside agencies for training.

Section three, on carpentry and joinery, discusses the evolution of the building trades of New York City, the nationality and ages of workers, employment conditions, mill and shop work, and erection work and includes a summary of trade findings.

Section four, on machinery building follows the same plan as the three preceding pamphlets. Important data is included on numbers engaged in the trade, nationality of the workers, the training of machinists, types of machine shops, special machine workers and outside agencies for training machinists.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Drawing in Grades.

905. Q:—"I have been employed as instructor of manual training in the junior-high school and I am somewhat at a loss to know just what to give to my seventh and eighth grades in mechanical drawing that can be correlated with their work in wood. To what extent should we teach mechanical drawing and lettering in these grades?"

A:—Opinions differ as to the amount of time to spend upon mechannical drawing in the grades, but the best authorities indicate nearly as much drawing as shopwork. In the seventh grade, one-fourth drawing, and three-fourths benchwork, in the eighth grade half and half, seem fair.

No inking should be attempted, but good boards, T-squares, triangles, 4-H pencils, and compasses are essential. If drawing is to be done at all, it must be done *right*. Slovenly habits to begin with are hard to overcome in later courses, and it really does the boys more harm than good to give them drawing that is not correct in mechanical execution. I have seen drawings made on bench tops with rulers alone—part of the lettering ¼", part ⅛", and the balance writing. One view may be on one side of the sheet, and the other on the reverse. Every principle of orthographic projection rudely violated. This kind of work leads nowhere, and is a rank waste of time. It should not be tolerated.

Begin the work with a standard sheet with standard border lines. Work from center lines. The first plate should teach the correct use of the T-square and the triangles. The lettering should be vertical Gothic caps ⅛" high. Guide lines and all construction lines should be put in very light—outlines gone over with the pencil to make them stand out. The correct relation of views should be impressed. The circle should receive some consideration in connection with a plate covering the degrees in the triangles.

To correlate the drawing with the woodwork, the best and most simple method is to require student drawings of all course projects, but drawn to a different scale.

In the eighth grade, some sketching should be given. The students should have the ability to make simple free-hand sketches from objects, both in perspective and orthographic—the latter with dimensions. They should be able to make perspective sketches from working drawings, and working sketches from perspectives.

So many students leave school after completing the eighth grade that this ability will be of far greater value to them than any other work that can be given them in a manual training course.—*Ralph F. Windoes.*

Mahogany Stain.

936. Q:—Please give me a formula for brown mahogany. Is it successful on the American mahogany?—*C. P. W.*

A:—It is a little difficult to answer this question in regard to a brown mahogany since there are some seven different shades from a light toned to a brown black in use at the present time. However, by using the following formula he can shade it any way he desires:

Bichromate of potash, 34 grams.
Lye, 3 grams.
Mahogany brown, 20 grams.
Black nigrosine, 6 grams.
Water, 1 gallon.

By using this stain on a dry piece and by increasing the amounts of the last three dyes any shade of brown may be used. The color should not be judged, however, until given a very thin coat of orange shellac. When a satisfactory shade has been reached, sponge the piece of cabinet work with clean water to raise the grain, sand carefully when dry and sponge on a heavy stain coat, preferably using a wide rubber-set brush. When thoroly dry size with a thin coat of orange shellac reduced one-half with alcohol. Let dry five hours and then sand smooth with worn out 00 paper after which use a Van Dyke brown filler. Let the filler dry 48 hours or more, sand very carefully to remove any cloudiness with 00 paper. After dusting off carefully, varnish and let dry three days after which sand with split 0000 paper. Three more coats should be used which when dry should be rubbed with felt pad, pumice stone and water, the last coat being rubbed with FF pumice stone, carefully cleaned up and polished with a good oil polish.—*Ralph G. Waring.*

Refinishing Chairs.

937. Q:—I have some old painted chairs, that I am "doing over" and I want to restore the painted designs of the fruits and flowers as nearly like the original as I can. The originals seem to be in a dull bronze copper color, and not a gilt. There seems to be some paints as well, of a sort of yellow color.

Please tell me how I can go about the work so the painting will not look so glaring and new.—*C. H. C. D.*

A:—If the paint and varnish on the old chairs are in good condition I should try careful cleaning with hot water, a sponge and a level tablespoonful of Golddust to a quart of water. Do not work with the sponge too wet. This should take off the accumulated grime of years and generally succeeds in producing a very satisfactory result.

Wherever any indentations or scratches have occurred these should be carefully leveled up according to the directions given in the article in the May magazine on pages 176 and 177, dealing with the use of Metallic Bronzes. After the putty has hardened thoroly and subsequently has been sanded down to a perfectly true surface it will be well to touch up each spot with either a little copper bronze to match that already on the chair or with a little thin undercoater tinted to match the paint. Apply both as directed in the article dealing with bronzes, being sure to use a very fine haired brush. If care is exercised in this matching of abrasions and the new color or bronze is worked on in such a manner as to fill in spaces outlined by natural breaks in the design or ornaments of the chair, the result will be unobtrusive and little noticed.

When these retouchings have thoroly hardened and dried, sand wherever necessary with split 0000 paper, dust off and carefully varnish with at least one coat of Pratt & Lambert's 61. In painting or varnishing chairs it is best to start by laying the chair on its back on a table or similar surface and varnishing all the inside surfaces of the legs and rungs first. Turn the chair successively on each side, finishing with the front and then complete the varnishing of the lower structure, handling it by the seat stand the chair on its feet. Do all portions of the back, finish up the head rail and spindle fronts, finishing the entire piece with the seat as the last operation. In a case of this kind where so many dust catching angles occur the use of the "tacky" cloth is especially recommended, since a piece of thin cotton cloth carefully wrung out in waste varnish will effectually remove all dust and lint which would otherwise be left at the base of the spindles to spoil the varnish work at a later operation. To remove the glaring newness of the dried varnish, rub enough with a felt pad, FF pumice stone and water to simply remove the gloss, after which wash up and clean with a good polishing oil.

In case the varnish and paint are cracked badly, it will be necessary to entirely remove this material. This can be accomplished either thru the use of a good varnish remover or by using a pound of sal soda or Golddust to a ten quart pail of boiling water, applying hot with a fiber brush. Let the alkali eat its way thru the paint after which scrape or wash off with a sponge. When completely removed go over the entire piece with undiluted vinegar and let dry. Sand up carefully and apply an undercoater tinted to match the original article. When this is dry apply a second coat if necessary and sand thoroly when hardened. Lay on the paint design first and when this is hardened work in all bronzing. When these two treatments are completely dry, varnish and rub as described.—*Ralph G. Waring.*

Finish for Gymnasium Floor.

941. Q:—Please suggest a method of finishing a maple gymnasium floor which is to be used for dancing and indoor athletics. It should not be too sheek for athletics. *R. P. M.*

A:—First, that the floor be rendered true, clean and level with machine sander or hand scraper and weighted block. After thoroly dusting it should be filled with a silex

filler reduced very thin with gasoline or benzine. Second that this filler be applied along a strip ten or fifteen boards wide brushing on across the grain. Let one man brush on the filler starting at the right hand side of the room, and working from the untreated to the treated portions of the floor. As soon as his work begins to lose its gloss let a second man use a large block of wood, faced with either leather or carpet with the nap turned in toward the block, and using this block to thoroly force this particular dried filler into the floor cracks working at all times across the grain. Let him be followed by a third man who will carefully clean up all edges and the general surface of the treated boards with burlap bagging cut up to ten or eight inch squares. He should be very careful to leave an absolutely clean surface and one that is entirely free from small skips which when dry are very hard and white and exceedingly difficult to remove with sandpaper or scraper. Some will maintain that a close grained wood like maple or birch does not need filling but it has been my experience and observation that when treated with a very thin filler soft and uneven grained spots are filled up and the whole floor has a much brighter and more evenly finished appearance than one not so treated. When the whole floor has been treated in this manner it should be left to dry for at least two days with plenty of heat if possible. Third this floor should be varnished with at least one well brushed coat of Pratt & Lambert's 61 varnish which is the only one I would really recommend for such exposed work. The use of this varnish coat will much improve any subsequent treatment as waxing and will also enable a much better and cheaper job of refinishing which the excessive wear on the gymnasium will make necessary in time. If possible it will be economy to give two coats of varnish and should be allowed to dry at least one week for each coat. If desired to use the floor for dancing, powdered parafine may be sifted on and brought to a perfect polish by using a piece of brussels carpet tacked to the bottom of a small box, containing four or five bricks, to which is attached a hinged handle. If this proves to be too slippery for gymnasium work the wax may be entirely removed with heavy cloths soaked in benzine.

In case it is necessary to refinish this floor in the future it will be necessary first to wash it thoroly in benzine to dissolve all wax which may have been used and should then be followed by a solution of hot water containing one-half pound of Gold dust to two gallons of water. This should be applied along a strip ten boards wide the full length of the gymnasium, well scrubbed in and then the beginning of the strip should be thoroly washed up with plenty of hot water and a big sponge. After the entire floor is carefully cleaned in this manner it should be allowed to dry at least two days and any shrinkage cracks developed since installation should be carefully filled with a silex putty which is simply unreduced filler. Let this filler dry a day, sand all streaks, clean dust off and then revarnish as in the first instance.—*Ralph G. Waring.*

Black Walnut Finish.

947. Q:—I wish to color some black walnut to match color common on organs some years ago. Hereabouts some twenty or thirty years ago parlor organs were very common. I am aware this is rather indefinite but can you help me any?—*F. E. C.*

A:—The walnut of twenty or thirty years ago was not colored by anilines, which were then unknown, but thru the use of so-called pigment stains.

In this particular instance a stain may be prepared by using one-half pound burnt sienna in oil, one pound burnt umber in oil, one quart of raw linseed, one pint of brown japan drier, one quart of turpentine. Have this mixed well and rub a little on the sample piece of walnut, using it just exactly as tho it were a filler. If desired two pounds of silex may be added without affecting the color and yet make this material become a filler in which case the worker will be saved one operation.

Let the sample panel dry over night and brush on a thin coat of orange shellac from stock, reduced one-half with alcohol. If the color is not dark enough add one-quarter to one-half pound of Van Dyke brown in oil and one to four ounces of drop black in oil. By adding these tinting colors it is possible to match practically every shade of walnut produced twenty years ago.

When the color is properly shaded apply to the cabinet work as for filler, clean up when set and let stand to dry 48 hours. Be sure all corners and edges are picked out carefully, dust off and give a coat of orange shellac reduced one-half with alcohol. Let dry five hours, sand with worn out 00 paper, dust off and varnish with a well brushed out coat of best grade varnish. After drying three days sand, clean off and revarnish. Rub with FF pumice stone, felt pad and water. Clean off, dry, revarnish. Repeat for four coats. Clean up in good oil polish after the last rubbing.—*Ralph G. Waring.*

Architectural Drawing.

948. Q:—"Please outline a course in architectural drawing for high school students."—*Q. A.*

A:—The correspondent has omitted the most essential detail—the time that can be devoted to the work, so a general reply alone can be given. Most high schools run their mechanical drawing courses two years or four years in length. If of the former class, the first year is devoted to elementary mechanical drawing and the second to a choice between machine or architectural drawing. If of the four year class, two years of elementary drawing are given and two years of either machine or architectural. Hence, an architectural drawing course must be suggested for one year, and another for two years of the work. In the latter course, the first year should be given over to details of construction. A boy must know how a house is built if he is to design one intelligently. He should draw details of sill, wall, and cornice constructions, and study every element in them as he draws them up. He should know which are the better constructions, and why. Which cost the most, and if they are worth it, why. The constructive work should comprise one-half of the course. Then he should design a house. The teacher should give him data—number of rooms, approximate cost, kind of construction, size of lot, etc. He should have access to plan books for suggestions—the same as an architect would have—and he should work up single line freehand sketches showing room arrangements and outside appearance. The teacher should select the best one of these sets of sketches, and the student should draw up conventional floor plans on cross-section paper from these sketches. Then he should make a complete set of working drawings to exact scale, and a set of tracings of them. Following this, he should draw a perspective of his house, and render it in colors. He can also trace his original perspective, and secure a pen and ink rendering of it. The balance of the time should be spent on plumbing and heating plans, specifications, and estimating.

In the one year course, one-half of the time should be spent on details of building construction, and the balance on a set of working drawings of a house, taken from the conventional drawings of some residence to be found in a plan book. Of course this does not result in an original set of plans, as far as room arrangement goes, but it gives the practical experience of making working drawings. From the plan book he can obtain, besides the room arrangement and sizes, the outside appearance as it will be found on the photographs which usually accompany such plans.—*Ralph F. Windoes.*

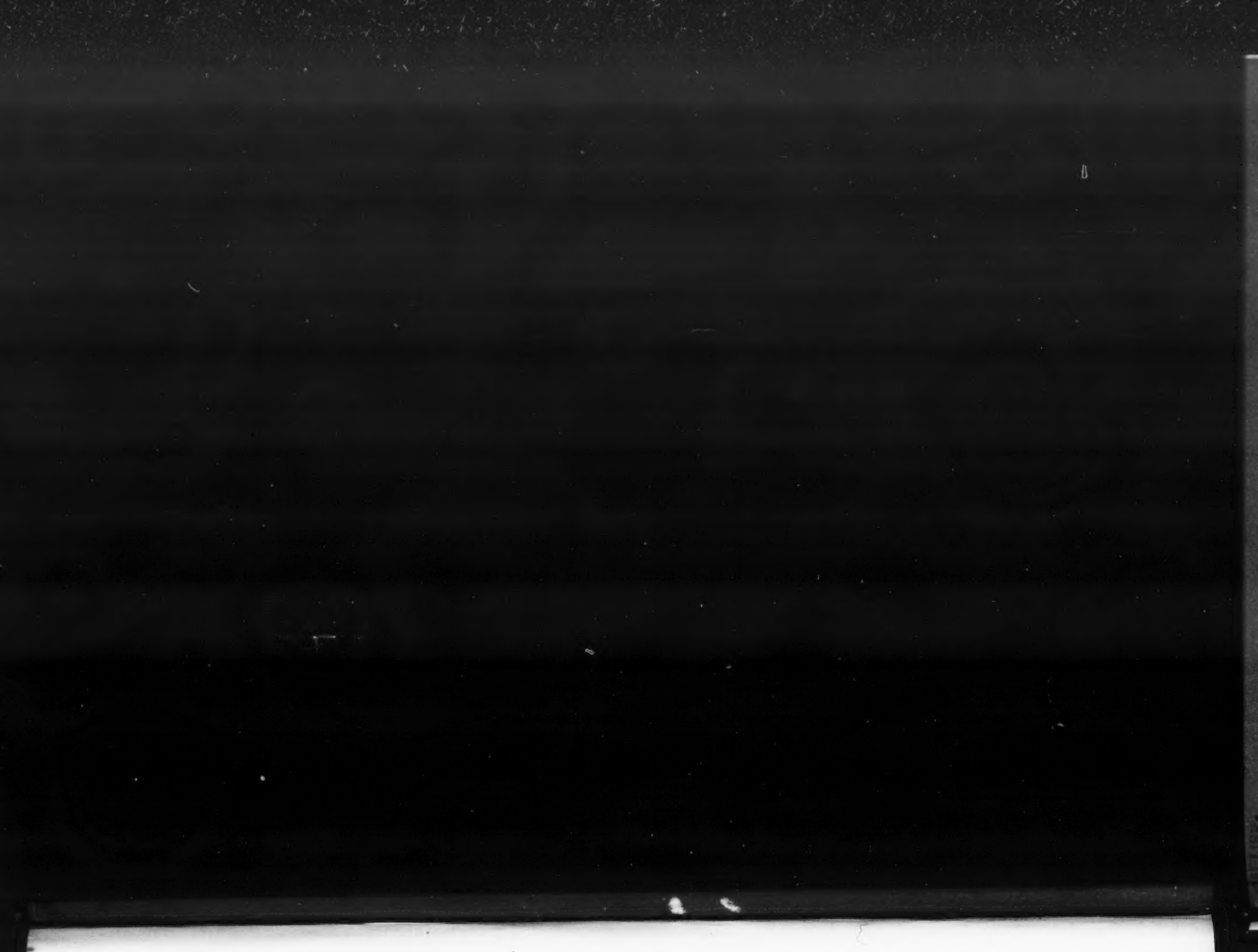
"1776" Soap Recipe.

A Connecticut principal of schools sends the following recipe in response to question No. 912.

1 can lye	1 tbsp. sugar (full but not level)
1 qt. cold water	1 tbsp. ammonia.
5 pounds grease	1 tbsp. borax (full but not level)

Warm grease. Dissolve the lye in a quart of water. When dissolved and cold (see that it is cold) stir into the warm grease. (Do not have grease hot.) Then add other ingredients. Stir until creamy. Pour into shallow box or pan for molding. Cut before it hardens.

Be careful and do not get lye or the dissolved lye on the hands. By trying out and straining the grease several times and mixing some glycerine, a very smooth soap may be made.

The foregoing recipe was used by the writer's mother for many years, and he used it many times in a small country school where soap was not considered an "essential" supply. The children brought the grease which had been tried out at home and the teacher supplied the other "makings." All enjoyed the fun of making the soap. The boys and girls had a supply of soap which was pure and without a bite. It gives a good lather and does not waste.

The greatly increased numbers of returned soldiers at Camp Pike, Ark., has made it necessary to add a second director of vocational training in the person of Mr. W. L. Caldwell. Mr. Caldwell will work with Dr. Henry Holtzclaw in the training of soldiers confined in the Camp Hospital.